
DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention records two or more record marks by the exposure of a laser beam on the optical recording medium and the above-mentioned optical recording medium which forms in detail the vision image of the magnitude which can be viewed by two or more record marks about the recording device and the record approach of recording data on the optical recording medium and the above-mentioned optical recording medium with which data are recorded, and relates to the recording device and the record approach of forming the vision image of the magnitude which can be viewed.

[0002]

[Description of the Prior Art] In recent years, CD-RW (CD-Rewritable) which are CD-R (CD-Recordable) which is the medium which can record data, DVD-R (Digital Versatile Disk-Recordable), DVD+R, and a rewritable medium, DVD-RW, and DVD+RW appeared. CD-R, DVD-R, and DVD+R are optical disks with which the recording layer is made of the photoreaction coloring matter film of an organic system with optical disks, the laser beam of high power is irradiated by this recording layer, and record of data is performed. In CD-R, DVD-R, and DVD+R, since it is the write-once (WriteOnce) method whose rewriting is impossible although the postscript of new data is possible after recording data, record of data is performed by the so-called multisession postscript record in which the physical data truck is divided into two or more sessions. On the other hand, CD-RW, DVD-RW, and DVD+RW are optical disks with which the recording layer is made of the phase change inorganic material of Ag-In-Sb-Te with optical disks, the laser beam of high power is irradiated at this recording layer, and record of data is performed. Record and elimination of data are performed in CD-RW, DVD-RW, and DVD+RW by the reversible phase change reaction which are a crystalline substance and physical transfer by being noncrystalline.

[0003] The one side record disk which has the recording layer is in current and one side at CD-R, CD-RW, DVD-R or DVD-RW, DVD+R, and DVD+RW. On the other hand, the field is the labelled surface of an one side record disk which can write in contents information etc. As an approach of recording contents information etc. on this labelled surface, there are an approach of writing in with a pen, the approach of sticking with a seal, etc. Moreover, recently, there is an one side record disk with which the printer bull coat was given to the labelled surface, and there is the approach of printing contents information etc. to a labelled surface by the printer etc.

[0004] Moreover, the appearance of a double-sided record disk whose CD-R, CD-RW,

DVD-R or DVD-RW, DVD+R, DVD+RW, etc. will have a recording layer to both sides from now on is expected.

[0005]

[Problem(s) to be Solved by the Invention] By the way, by the approach of writing contents information etc. in a labelled surface with a pen with the hard point of a brush, by the approach which may attach a blemish to a recording layer or a reflecting layer by the writing pressure produced in case it writes in, and writes contents information etc. in a labelled surface with an elasticity point of a brush pen, it may rub and contents information etc. may disappear.

[0006] Moreover, by the approach of sticking contents information etc. on a labelled surface with a seal, in case mass eccentricity may occur on a disk with the weight of a seal, for this reason especially data are read from a disk at high speed and data are recorded on a disk at high speed, an error may arise.

[0007] Furthermore, by the approach of printing contents information etc. to the labelled surface to which the printer bull coat was given by the printer, since the printing side is unreserved, it is sufficient for a blemish just, and a contaminant may adhere and the contents information rubbed and printed may disappear.

[0008] On the other hand, when the double-sided record disk which has a recording layer appears in both sides, it is necessary to record contents information etc. on locations other than a recording surface. However, locations other than a recording surface may be narrow, and only the limited information can be recorded, but visibility may worsen.

[0009] Then, this invention is proposed in view of the actual condition which was mentioned above, a record mark records on the optical recording medium and the above-mentioned optical recording medium which forms the vision image of the magnitude which can be viewed by two or more record marks by the exposure of a laser beam, and it aims at offering the recording device and the record approach of forming vision images, such as contents information on the magnitude which can be viewed by two or more record marks.

[0010]

[Means for Solving the Problem] In order that the optical recording medium concerning this invention may solve an above-mentioned technical problem, the laminating of the recording layer in which a record mark is formed of the exposure of a laser beam is carried out on the substrate, and the vision image of the magnitude which can be viewed by two or more record marks is formed in the location or the predetermined location of arbitration of the above-mentioned recording layer.

[0011] In order that the optical recording medium concerning this invention may solve an above-mentioned technical problem, the laminating of the sensible-heat layer reacted to a laser beam is carried out on the substrate, and the above-mentioned sensible-heat layer shows the reaction which can be viewed by the exposure of a laser beam.

[0012] In order that the optical recording medium concerning this invention may solve an above-mentioned technical problem, the laminating of the recording layer in which a record mark is formed of the exposure of a laser beam is carried out on the substrate, and the field for data logging and the field for vision image record which can be viewed are formed in the above-mentioned recording layer at least.

[0013] A laser beam exposure means to irradiate a laser beam at an optical recording medium in order that the recording device concerning this invention may solve an above-

mentioned technical problem, It has a vision image-data conversion means to change the data of arbitration into a vision image data. The vision image data changed with the above-mentioned vision image-data conversion means is supplied to the above-mentioned laser beam exposure means, and the vision image of the magnitude which can be viewed in the location or the predetermined location of arbitration of the above-mentioned optical recording medium is formed by two or more record marks with the above-mentioned laser beam exposure means.

[0014] In order to solve an above-mentioned technical problem, the record approach concerning this invention generates a vision image data from the data of arbitration, irradiates the laser beam according to the above-mentioned vision image data in the location or the predetermined location of arbitration of an optical recording medium, and forms the vision image of the magnitude which can be viewed by two or more record marks.

[0015]

[Embodiment of the Invention] Hereafter, it explains to a detail, referring to a drawing about the gestalt of operation of this invention.

[0016] This invention is applied to the data-logging regenerative apparatus 1 as shown in drawing 1 .

[0017] The data-logging regenerative apparatus 1 The OP (Optical Pickup) section 10, RF IC11, the system control section 12, and the spindle driver 13, The thread driver 14, the focal driver 15, and the tracking driver 16, A spindle motor 17, the thread motor 18, and CPU19 (Central Processing Unit), It has a flash ROM 20, RAM21, an interface 22, and the vision image generation section 24, record of data, playback, and elimination are performed to an optical disk 25, and the external instrument 23 is connected through the interface 22.

[0018] Moreover, the system control section 12, CPU19, a flash ROM 20, RAM21, an interface 22, and the vision image generation section 24 perform transmission or/and reception of a signal mutually through the bus A which is Maine Bath.

[0019] The OP section 10 is connected to RF IC11, the system control section 12, the focal driver 15, and the tracking driver 16. With an objective lens, a laser diode, a laser diode driver (LD Driver), and a photodetector, the OP section 10 is equipped with the half mirror etc., and supplies the lightwave signal detected by the photodetector to RF IC11. Moreover, for the OP section 10, the light strategy signal which shows a flash and driving signal of laser required for formation of a record mark and laser beam reinforcement, and the optimum value of blinking in case data are recorded on an optical disk 25 is the system control section 12 and RF. It is supplied by IC11. Moreover, the OP section 10 is controlled by the focal driver 15 and the tracking driver 16.

[0020] RF IC11 is connected to the system control section 12. RF IC11 performs data processing, such as a sampling and a hold, for eight signals which consist of the beam signals detected from the OP section 10, sides, and Maine, and generates signals, such as a predetermined signal to a focal error (FE, Focus Error) signal, a tracking error (TE, Tracking Error) signal, a mirror (MIRR, Mirror) signal, an ATIP (Absolute Time In Pregroove) signal, a read-out Mayne signal, etc., among eight signals. RF IC11 supplies a FMDT (Frequency Modulation Data) signal, a FMCK (Frequency Modulation Clock) signal, FE signal, and TE signal to the system control section 12 among the generated signals, and supplies the optimum-value (OPC, Optimum PowerCalibration) signal of

laser beam reinforcement, and the laser flash and the driving signal which were detected by trial writing to LDDriver of the OP section 10.

[0021] It connects with the spindle driver 13, the thread driver 14, the focal driver 15, and the tracking driver 16, and the system control section 12 is controlled by CPU19. A FMDT signal, a FMCK signal, TE signal, and FE signal are inputted from RF IC11, and the system control section 12 generates the servo control signal which is controlled by CPU19 and controls various kinds of servoes. The system control section 12 generates an analog signal from the generated servo control signal, and supplies the above-mentioned analog signal to the spindle driver 13, the thread driver 14, the focal driver 15, and the tracking driver 16.

[0022] Moreover, the system control section 12 processes CIRC (Cross Interleaved Reed-Solomon Code) decoding and encoding, light strategy, ADDr decoding, etc. In case the system control section 12 records data on an optical disk 25, it supplies the signal which shows the optimum value of a flash and driving signal of laser, and laser beam reinforcement to the OP section 10. Moreover, as for the system control section 12, a vision image is supplied from the vision image generation section 24 through Bus A. This vision image is formed on an optical disk 25 as an image which can be viewed by two or more record marks.

[0023] It connects with the spindle motor 17 and the spindle driver 13 controls a revolution of a spindle motor 17 based on the signal supplied from the system control section 12. It connects with the thread motor 18 and the thread driver 14 controls thread actuation of the thread motor 18 based on the signal supplied from the system control section 12. Based on the signal supplied from the system control section 12, the focal driver 15 moves the OP section 10 perpendicularly to an optical disk 25, and controls the focal location of a beam. The tracking driver 16 rocks the OP section 10 based on the signal supplied from the system control section 12, and controls the location of the beam spot irradiated by the optical disk 25.

[0024] A spindle motor 17 rotates an optical disk 25 based on the signal supplied from the spindle driver 13. The thread motor 18 performs thread actuation of the OP section 10 based on the signal supplied from the thread driver 14.

[0025] CPU19 controls the system control section 12 through Bus A. The program for processing the data currently recorded on the optical disk 25 is stored in the flash ROM 20.

[0026] RAM21 is volatile memory which memorizes the management information of an optical disk 25.

[0027] An interface 22 connects an external instrument 23, for example, is a connection corresponding to specification, such as SCSI (Small Computer System Interface), ATAPI (AT Attachiment Interface), IEEE-1394, USB (Universal Serial Bus), and Blue Tooth. Moreover, an interface 22 may be a connection corresponding to semiconductor memory. An external instrument 23 is a device which supplies data, such as a photograph, a picture, or an alphabetic character, to the data-logging regenerative apparatus 1 through an interface 22. External instruments 23 are motion picture camera machines, such as a digital camera. The vision image generation section 24 changes into a predetermined data format the data inputted through the interface 22.

[0028] Optical disks 25 are record media, such as CD-RW (CDRewritable) in which record of data, playback, and elimination are possible, and CD-R (CD-Recordable) in

which record of data, playback, and ****** are possible. PCA (Power Calibration Area), PMA (Program Memory Area), the lead-in groove information field, the program field, and the lead-out information field are session-ized by the data area as shown in an optical disk 25 at drawing 2 . PCA is a field which applies a laser beam in the case of OPC, and is used for optimization of laser beam reinforcement. PMA is a field where the address information which is needed in case data are ******(ed) to an optical disk 25 is stored temporarily. In the program field, data are contained actually. A lead-in groove is a field where TOC (Table Of Contents) which is the index information on a truck is memorized after FAINA rise processing. The lead-out information field is added to the last of data. Therefore, the field after a lead-out information field is a data sheep record section.
[0029] moreover -- optical disks, such as CD-RW, -- the outside from the inside of a disk -- turning -- continuous -- being spiral (spiral) -- data are recorded. Such a record approach is called the sequential light approach. The sequential light approach has DAO (Disc At Once), TAO (Track At Once), and packet-writing. DAO records the data for one disk at a stretch, and is the record approach in which ****** of data is impossible in later. TAO records data per truck and is the record approach in which ****** of data is possible in later. Packet-writing can record data in a unit still smaller than the truck of TAO, and is the record approach in which ****** of data is possible in later. Although TAO is only unrecordable a maximum of 99 trucks, packet-writing is the record approach which there is no limit in the number of packets, and is easy to treat on an activity.
[0030] Usually, in the data-logging regenerative apparatus 1, the recording surface of an optical disk 25 is physically changed by the strength of laser beam reinforcement, a record mark is recorded, and the strength of the laser beam reinforcement is recorded on the optical disk 25 as digital data of "0" and "1." Reflection factors differ and the location where this laser beam reinforcement is strong, and a weak location can also be checked by viewing. In this invention, the difference in this reflection factor is used and the vision image which can be viewed by two or more record marks is formed on an optical disk 25. The example which forms in below the vision image which can be viewed on an optical disk 25 is shown.
[0031] Here, an example is described below about actuation of the vision image generation section 24 at the time of using an external instrument 23 as a digital camera (hereafter referred to as DSC.).
[0032] DSC is equipped with the photography section, the picture signal data-processing section, etc. The photography section is equipped with the lens section which incorporates a photographic subject, CCD, the S/H circuit section, and an A/D converter. From the image of the photographic subject supplied from the lens section, CCD generates a picture signal and supplies the generated picture signal to the S/H circuit section. The S/H circuit section performs data processing, such as a sampling and a hold, and supplies the above-mentioned picture signal to an A/D converter. An A/D converter changes the above-mentioned picture signal into a digital picture signal, and supplies it to the picture signal data-processing section. The picture signal data-processing section performs image processings, such as color criteria form conversion to the color difference and a luminance signal from an RGB code, a white balance, a gamma correction, and a cutback image processing, to the digital picture signal supplied from the photography section. The processed digital picture signal is supplied to the data-logging regenerative apparatus 1 through an interface 22, and is temporarily memorized by RAM21 grade.

[0033] The data temporarily memorized by the RAM21 grade from the external instrument 23 through the interface 22 are supplied to the vision image generation section 24, and are changed into a predetermined data format. Below, drawing 3 and drawing 4 are used and explained about conversion of the vision image generation section 24.
[0034] The vision image generation section 24 is changed into the data format of bit map data as shown in drawing 3 when the data which photoed the "vehicle" are supplied by DSC. And the vision image generation section 24 generates a vision image for the data changed into the data format of bit map data based on a translation table. The vision image generation section 24 divides into 30 line x70 train the bit map data shown in drawing 3 based on the translation table which has two kinds of translation data, "1" and "0", sets to "1" the field where data exist in each division field of the, sets to "0" the field where data do not exist, and as shown in drawing 4 , it changes it into the data of "1", and "0."
[0035] Moreover, an example about actuation of the vision image generation section 24 at the time of using an external instrument 23 as an alphabetic character input device is described below.
[0036] An alphabetic character input device inputs the alphabetic character of arbitration as text data, and supplies the above-mentioned text data to the data-logging regenerative apparatus 1 through an interface 22. The above-mentioned text data is temporarily memorized by RAM21 grade. And the data temporarily memorized by the RAM21 grade are supplied to the vision image generation section 24, and are changed into a predetermined data format. Below, drawing 5 and drawing 6 are used and explained about conversion of the vision image generation section 24.
[0037] The vision image generation section 24 is changed into the data format of bit map data as shown in drawing 5 when the text data "2001" is supplied by the alphabetic character input device. And the vision image generation section 24 generates a vision image for the text data changed into the data format of bit map data based on a translation table. The vision image generation section 24 divides into 30 line x70 train the bit map data shown in drawing 5 based on the translation table which has two kinds of translation data, "1" and "0", sets to "1" the field where data exist in each division field of the, sets to "0" the field where data do not exist, and as shown in drawing 6 , it changes it into the data of "1", and "0."
[0038] Moreover, the vision image generated in the above-mentioned vision image generation section 24 may be an example, and may be the contents information on an optical disk 25, the count of playback, a recording rate, the remaining storage capacity, or a record format. Furthermore, only a postscript records the serial number for alteration prevention on the possible optical disk 25 as a vision image, and is [protection of copyrights] good in drawing.
[0039] In addition, even if data format is not a format of the bit map data mentioned above, if convertible for a vision image, other formats are sufficient as it. The translation table may have translation data of two or more classes as shown not only in two kinds of translation data of "1" mentioned above and "0" but in drawing 7 . Blue and "2" are corresponded to green and "3" is made to correspond red and "1" to white in "0 [in this case,]." Division of bit map data may be changed according to the magnitude of the vision image instead of 30 line x70 train mentioned above recorded on an optical disk 25.
[0040] Moreover, the vision image changed into "1" and "0" is changed into the data

stream which added the Sync mark for making it synchronize with the revolution periodic signal of an optical disk 25 to arbitration by the system control section 12 of the data-logging regenerative apparatus 1 as shown in drawing 8 . The data stream shown in drawing 8 (e) shows the joint data stream with which the data stream to which the Sync mark 1 shown in drawing 8 (a) was added, the data stream to which the Sync mark 2 shown in drawing 8 (b) was added, the data stream to which the Sync mark 3 shown in drawing 8 (c) was added, and the data stream to which the Sync mark 4 shown in drawing 8 (d) was added were combined.

[0041] Thus, the joint data stream to which the Sync mark was added is changed into an output-data train by the system control section 12. In joint data stream a as a joint data stream shows to drawing 9 (a), an output-data train May change into the output-data train a which outputted joint data stream a as shown in drawing 9 (b) as it was, and You may change into the output-data train b divided into the Duty ratio of arbitration as shown in drawing 9 (c), and may change into the output-data train c modulated based on the output-data train b as shown in drawing 9 (d) with the eight-to-fourteen modulation method, 8-16 modulation technique, or the RLL method.

[0042] The OP section 10 turns on record laser to an optical disk 25, when playback laser is turned on to an optical disk 25 when the data of "0" are inputted, and the data of "1" are inputted. Thus, the vision image which can be viewed by the difference in the reflection factor of the location where the data of "0" were inputted into the optical disk 25, and the location where the data of "1" were inputted is formed.

[0043] The optical disk which has the vision image recording layer of the dedication by which the vision image which can be viewed by two or more record marks is formed in an optical disk 25, and the optical disk do not have the vision image recording layer of dedication are, and a vision image is formed in a vision image recording layer of two or more record marks, and, in the case of the optical disk have a vision image recording layer, in the case of the optical disk do not have a vision image recording layer, is formed in the data sheep record section of a data-logging layer of two or more record marks.

[0044] Moreover, it is possible to attach contrast, such as light and darkness, a shade, or/and a cubic effect, to the vision data recorded on an optical disk 25 by combining locally the pattern of the Duty ratio of the output-data train b shown in drawing 9 (c) by what has a quick period, and the late thing, or making the truck which is not recorded [record and] to alternation or arbitration, and changing the record point size per unit area etc.

[0045] Here, the configuration of the system control section 12 is explained. The system control section 12 is [the revolution period detecting element 100, the division ratio setting-out section 101, the Sync Timing generation section 102, the synchronous circuit section 103, the modulation-technique change section 104, and] CIRC encoding / decoding, as shown in drawing 10 . It has the On-Off control section 105, the encoder-pattern generating section 106, the selector section 107, the light strategy section 108, and a light/lead LD 109. The revolution period detecting element 100 synchronizes the signal and FG signal which are supplied from the division ratio setting-out section 101. The signal which synchronized by the revolution period detecting element 100 is supplied to the Sync Timing generation section, and the signal with which Sync Timing was added is generated. The encoder-pattern generating section 106 is the modulation-technique change section 104, and CIRC encoding / decoding about the data stream of the vision

image supplied from the vision image generation section 24. It changes into the output-data train later mentioned by the On-Off control section 105. The synchronous circuit section 103 generates a synchronizing signal from the Sync Timing signal supplied from the Sync Timing generation section 102, and the output-data multiple-message-transmission number supplied from the encoder-pattern generating section 106. The synchronous circuit section 103 supplies the generated synchronizing signal to the light strategy section 108 through the selector section 107.

[0046] Next, FG signal is explained below. A spindle motor 17 makes an optical disk 25 generate FG signal according to actuation of the motor when giving driving force. This FG signal is engine-speed information generated whenever the engine-speed information 25 on a spindle motor 17, i.e., an optical disk, makes one revolution. Moreover, when a spindle motor 17 consists of a three-phase motor, rotational frequency information is generated by the timing signal for a change-over of a phase, and when FG plate for FG signal generation is formed in the turntable which supports an optical disk 25, it is generated because FG plate rotates. In addition, FG signal usually shows one revolution of a motor by 18 waves or 24 waves.

[0047] Here, the approach of the motor control at the time of recording a vision image on an optical disk 25 and the control timing of a laser beam is explained.

[0048] There is the approach of carrying out roll controls, such as CLV (Constant Linear Velocity) of an optical disk 25 and CAV (Constanat Angular Velocity), as the 1st approach based on address information, such as an ATIP signal included in an optical disk 25, an ADIP (Adress In Pregroove) signal, or a Sub-code Q-channel signal, carrying out timing control of positioning at the time of forming a vision image, and carrying out timing control which is not recorded [record of a laser beam and].

[0049] There is the approach of carrying out a roll control as the 2nd approach using the output of FG signal of the hall sensor with which the data-logging regenerative apparatus 1, such as a spindle motor 17 and a turntable, are equipped, carrying out timing control of positioning at the time of forming a vision image, and carrying out timing control which is not recorded [record of a laser beam and].

[0050] There is the approach of carrying out the roll control of an optical disk as the 3rd approach combining the 1st approach of the above and the 2nd approach of the above, carrying out timing control of positioning at the time of forming a vision image, and carrying out timing control which is not recorded [record of a laser beam and].

[0051] There is the approach of carrying out the roll control of an optical disk, and carrying out timing control of positioning at the time of forming a vision image, and carrying out timing control which is not recorded [record of a laser beam and] using the output obtained from a signal equivalent to the bar code and it which were prepared in the inner circumference of the optical disks 25, such as Photo-CD, as the 4th approach as substitution of FG signal.

[0052] Next, it explains with reference to the flow chart which shows the vision image changed into the data of 30 line x70 train as mentioned above to drawing 11 with the data-logging regenerative apparatus 1 about an example of actuation in the case of forming in the data sheep record section of an optical disk 25.

[0053] Setting to a step ST 1, the data-logging regenerative apparatus 1 checks that the optical disk 25 has been installed in a predetermined location.

[0054] In a step ST 2, the data-logging regenerative apparatus 1 checks the record

condition of an optical disk 25. The capacity of an optical disk 25 and the residue of a data sheep record section are checked, or the existence of TOC currently recorded on PMA or a lead-in groove information field is checked. In addition, TOC recorded on PMA is provisional TOC, and when it performs FAINA rise processing to an optical disk 25, it records the above-mentioned provisional TOC on a lead-in groove information field as TOC of a forward type.

[0055] Here, FAINA rise processing is explained. The data of the optical disk with which data are recorded in the UDF (Universal Disk Format) file format are unreproducible with a common personal computer (PC, PersonalComputer). It is because PC is not supporting the UDF file format. Then, in order to enable it to play with PC the optical disk by which the UDF file format is carried out, it is necessary to change the file format of an optical disk into file formats, such as ISO 9660 which PC is supporting. This conversion is called FAINA rise processing.

[0056] In a step ST 3, it judges that the data-logging regenerative apparatus 1 can form a vision image in an optical disk 25 based on the recognition activity over the optical disk 25 of a step ST 2. For example, the optical disk 25 with the narrow data sheep record section which can form a vision image since data are recorded so much even if it is possible to form a vision image is judged to be the disk which cannot form a vision image.

[0057] The optical disk 25 with the large data sheep record section which can form a vision image is judged to be the disk which can form a vision image, and progresses to a step ST 4.

[0058] In a step ST 4, the data-logging regenerative apparatus 1 does the recognition activity of the disk type of an optical disk 25, and a disk type judges whether record and elimination of data are possible. Only the postscript of the disk which can only reproduce data, such as CD-DA and CD-ROM, and data, such as CD-R, has a possible disk and the disk which CD-RW etc. eliminates [record and] in a disk type. [of data]

[0059] When the disk type of an optical disk 25 has been recognized that only a postscript is possible possible [playback of data] according to the recognition activity of a step ST 4, it progresses to a step ST 7, and when recognized as record and elimination of data being possible for a disk type, it progresses to a step ST 5.

[0060] In a step ST 5, the data-logging regenerative apparatus 1 chooses whether the data sheep record section of an optical disk 25 is all eliminated. When not performing all elimination of the data sheep record section of an optical disk 25, it progresses to a step ST 7, and when performing all elimination of the data sheep record section of an optical disk 25, it progresses to a step ST 6.

[0061] In a step ST 6, the data-logging regenerative apparatus 1 performs all elimination of the data sheep record section of an optical disk 25. When the vision image is recorded on the data sheep record section of an optical disk 25 by last time by the elimination activity of a step ST 6, all the above-mentioned vision images are eliminated.

[0062] In a step ST 7, the data-logging regenerative apparatus 1 generates a record image based on the vision image generated by the vision image generation section 24. A record image is an image for checking, before recording the situation when recording a vision image on an optical disk 25. The data-logging regenerative apparatus 1 connects to Bus A the monitor which is not illustrated, and checks a record image with the above-mentioned monitor. Here, generation of a record image is explained below.

[0063] Based on the check of the record condition of the optical disk 25 by the step ST 2, the condition of an optical disk 25 is displayed on a monitor, as shown in drawing 12 . In addition, although [this example] the data-logging finishing field 200 and the data sheep record section 201 are displayed, things other than the above may be displayed. The vision image generated in the vision image generation section 24 is formed in the data sheep record section 201. The data-logging regenerative apparatus 1 creates a record image as adjusted the record location of adjustment of the magnitude of a vision image, a configuration, etc., and the vision image at the time of recording on an optical disk 25, for example, shown in drawing 13 .

[0064] In a step ST 8, the data-logging regenerative apparatus 1 sets up the record conditions at the time of forming a vision image in an optical disk 25. At a step ST 8, formation conditions, such as a formation rate at the time of forming a vision image and reinforcement of a laser beam, are set as an optical disk 25.

[0065] In a step ST 9, the data-logging regenerative apparatus 1 forms a vision image in an optical disk 25 by two or more record marks. At this time, the progress situation of formation of a vision image may be displayed on a monitor. Moreover, when PCA is filled with data although trial writing of a laser beam is performed using PCA in case a vision image is formed in an optical disk 25, trial writing of a laser beam decides to use a part for the outermost periphery of for example, a data sheep record section.

[0066] In a step ST 10, the data-logging regenerative apparatus 1 chooses whether a vision image is newly formed in an optical disk 25. When forming a vision image in an optical disk 25 newly, it returns to a step ST 4.

[0067] According to the procedure of the step ST 1 which was mentioned above - a step ST 10, the data-logging regenerative apparatus 1 forms the vision image which can be viewed to the data sheep record section of an optical disk 25 by two or more record marks. Moreover, at a step ST 3, if it is the case where data are recorded for the optical disk 25 by DAO, and the case where the FAINA rise is given and is a certain case more than the field where a data sheep record section is fixed, the above-mentioned optical disk 25 will be judged to be the medium which can record a vision image. If an optical disk 25 is in such a condition, on a format, ****** is impossible for an optical disk 25. Therefore, even if the vision image is formed in the data sheep record section, a problem is not produced in compatibility etc.

[0068] Moreover, the vision image formed in the data sheep record section of an optical disk 25 may be directly supplied to the system control section 12 from an external instrument 23. In addition, a step ST 7 is skipped in this case.

[0069] What is necessary is just to make into the record condition all the fields of PCA which is the trial writing field of a laser beam, before forming a vision image when all data storage areas form a vision image in the optical disk 25 which is in the condition of not recording. If an optical disk 25 is in such a condition, on a format, ****** is impossible for an optical disk 25. Therefore, even if the vision image is formed in the data sheep record section, a problem is not produced in compatibility etc.

[0070] Moreover, the data-logging regenerative apparatus 1 recognizes the record condition of the data sheep record section of an optical disk 25. Below, the data-logging regenerative apparatus 1 which can recognize the record condition of the data sheep record section of an optical disk 25 explains an example of the actuation formed in the data sheep record section of an optical disk 25 with reference to the flow chart shown in

drawing 14 and drawing 15 .
[0071] In a step ST 21, the data-logging regenerative apparatus 1 checks that the optical disk 25 has been installed in a predetermined location as it is shown in drawing 14 .
[0072] In a step ST 22, the data-logging regenerative apparatus 1 checks the record condition of an optical disk 25. The capacity of an optical disk 25 and the residue of a data sheep record section are checked, or the existence of TOC currently recorded on PMA or a lead-in groove information field is checked. In addition, TOC recorded on PMA is provisional TOC, and when it performs FAINA rise processing to an optical disk 25, it records the above-mentioned provisional TOC on a lead-in groove information field as TOC of a forward type. About FAINA rise processing, it is the same as that of the explanation which was the above-mentioned step ST 2.
[0073] Moreover, the check of whether the vision image is formed in the data sheep record section of an optical disk 25 is also performed.
[0074] In a step ST 23, it judges that the data-logging regenerative apparatus 1 can record a vision image on an optical disk 25 based on the recognition activity over the optical disk 25 of a step ST 22. For example, the optical disk 25 with the narrow data sheep record section which can form a vision image since data are recorded so much even if it is possible to form a vision image is judged to be the disk which cannot form a vision image.
[0075] The optical disk 25 with the large data sheep record section which can form a vision image is judged to be the disk which can form a vision image, and progresses to a step ST 24.
[0076] In a step ST 24, the data-logging regenerative apparatus 1 does the recognition activity of the disk type of an optical disk 25, and a disk type judges whether record and elimination of data are possible. Only the postscript of the disk which can only reproduce data, such as CD-DA and CD-ROM, and data, such as CD-R, has a possible disk and the disk which CD-RW etc. eliminates [record and] in a disk type. [of data]
[0077] When the disk type of an optical disk 25 has been recognized that only a postscript is possible possible [playback of data] according to the recognition activity of a step ST 24, it progresses to a step ST 27, and when recognized as record and elimination of data being possible for a disk type, it progresses to a step ST 25.
[0078] In a step ST 25, the data-logging regenerative apparatus 1 performs partial elimination or selection of whether to all eliminate for the data sheep record section of an optical disk 25. When not performing partial elimination or all elimination of an optical disk 25 of a data sheep record section, it progresses to a step ST 27, and when performing partial elimination or all elimination of an optical disk 25 of a data sheep record section, it progresses to a step ST 26.
[0079] In a step ST 26, the data-logging regenerative apparatus 1 performs partial elimination or all elimination of an optical disk 25 of a data sheep record section.
[0080] In a step ST 27, the data-logging regenerative apparatus 1 generates a record image based on the vision image generated by the vision image generation section 24. A record image is an image for checking, before forming the situation when forming a vision image in an optical disk 25. The data-logging regenerative apparatus 1 connects to Bus A the monitor which is not illustrated, and checks a record image with the above-mentioned monitor. About generation of a record image, it is the same as that of the explanation which was the above-mentioned step ST 7.

[0081] In a step ST 28, it judges whether the data-logging regenerative apparatus 1 has lapped with the vision image which the record image generated at a step ST 27 formed in the data sheep record section of an optical disk 25 by last time. When the vision image has not lapped, it progresses to a step ST 30, and when the vision image has lapped, it progresses to a step ST 29.
[0082] In a step ST 29, the data-logging regenerative apparatus 1 judges whether overwrite formation of a vision image is performed. Return and when not performing overwrite formation of a vision image, redoing generation of a record image again and performing overwrite formation of a vision image, it progresses to a step ST 27 at a step ST 30.
[0083] In a step ST 30, the data-logging regenerative apparatus 1 sets up the formation conditions at the time of recording a vision image on an optical disk 25 as it is shown in drawing 15 . At a step ST 30, formation conditions, such as a formation rate at the time of forming a vision image and reinforcement of a laser beam, are set as an optical disk 25.
[0084] In a step ST 31, the data-logging regenerative apparatus 1 forms a vision image in an optical disk 25 by two or more record marks. At this time, the progress situation of formation of a vision image may be displayed on a monitor. Moreover, when PCA is filled with data although trial writing of a laser beam is performed using PCA in case a vision image is formed in an optical disk 25, trial writing of a laser beam decides to use a part for the outermost periphery of for example, a data sheep record section.
[0085] In a step ST 32, the data-logging regenerative apparatus 1 chooses whether a vision image is newly formed in an optical disk 25. Return and when forming a vision image in an optical disk 25 newly, and not forming a vision image in an optical disk 25 newly, it progresses to a step ST 24 at a step ST 33.
[0086] In a step ST 33, the data-logging regenerative apparatus 1 chooses whether the vision image formed in the optical disk 25 at a step ST 31 is collated. When collating a vision image, it progresses to a step ST 34.
[0087] In a step ST 34, the data-logging regenerative apparatus 1 collates the vision image formed in the optical disk 25.
[0088] In a step ST 35, the data-logging regenerative apparatus 1 judges whether the vision image was correctly formed in the optical disk 25, as a result of collating the vision image formed in the optical disk 25 by the step ST 34. When it is judged that the vision image is not correctly formed in an optical disk 25, it progresses to a step ST 36.
[0089] In a step ST 36, the disk type of the optical disk 25 with which the data-logging regenerative apparatus 1 was judged that the vision image is not formed correctly judges whether record and elimination of data are possible. When the disk type of an optical disk 25 judges that record and elimination of data are possible, it progresses to a step ST 37.
[0090] In a step ST 37, it judges whether the data-logging regenerative apparatus 1 forms a vision image in an optical disk 25 again. When it is judged that the reconstititution of the vision image is carried out to an optical disk 25, it returns to a step ST 25.
[0091] According to the procedure of the step ST 21 which was mentioned above - a step ST 38, the data-logging regenerative apparatus 1 forms the vision image which can be viewed to the data sheep record section of an optical disk 25 by two or more record marks.
[0092] Moreover, at a step ST 23, if it is the case where data are recorded for the optical disk 25 by DAO, and the case where the FAINA rise is given and is a certain case more

than the field where a data sheep record section is fixed, the above-mentioned optical disk 25 will be judged to be the medium which can form a vision image. If an optical disk 25 is in such a condition, on a format, ****** is impossible for an optical disk 25. Therefore, even if the vision image is formed in the data sheep record section, a problem is not produced in compatibility etc.

[0093] Moreover, the vision image formed in the data sheep record section of an optical disk 25 may be directly supplied to the system control section 12 from an external instrument 23. In addition, a step ST 27 is skipped in this case.

[0094] What is necessary is just to record data on all the fields of PCA which is the trial writing field of a laser beam, before forming a vision image when all data storage areas form a vision image in the optical disk 25 which is in the condition of not recording. If an optical disk 25 is in such a condition, on a format, ****** is impossible for an optical disk 25. Therefore, even if the vision image is formed in the data sheep record section, a problem is not produced in compatibility etc.

[0095] In ****, although the data-logging regenerative apparatus 1 gave explanation at the time of changing into a vision image the data supplied from the external instrument 23 through the interface 22 in the vision image generation section 24, it may generate a vision image by approaches other than ****. For example, as long as an optical disk 25 is a format of CD-Text, the contents information included in above-mentioned CD-Text may be used as a vision image.

[0096] Moreover, contents information etc. can be acquired through the Internet. The data-logging regenerative apparatus 1 may use the contents information acquired through the Internet as a vision image.

[0097] There are a disk of a double-sided type [as / whose both sides are the playback side of data, a playback recording surface or an eliminable playback recording surface], and a disk of the one side type which a field is the playback side of data, a playback recording surface, or an eliminable playback recording surface on the other hand, and is the field (it is hereafter called a contents information write-in field.) which writes in the contents information that an another side side can be viewed etc. in an optical disk 25. The data-logging regenerative apparatus 1 which applied this invention to below shows the example which records a vision image with the laminated structure of an optical disk 25 to the above optical disks 25.

[0098] There are a double-sided type whose both sides are playback sides, and an one side type of the optical disks 25 only for playbacks whose field is a playback side on the other hand and whose another side side is a contents information write-in field, for example, they are CD-DA, CD-ROM, DVD(Digital Versatil Disk)-Video, DVD-ROM, DVD-Audio, etc. In addition, DVD is a disk of 1.2mm thickness and the diameter of 12cm which uses a polycarbonate as a base material as well as CD. Moreover, DVD has the structure where two disks of 0.6mm thickness were made to rival, to CD being the veneer of 1.2mm thickness.

[0099] As the optical disk 25 only for playbacks is shown in drawing 16 (a), the laminating of a reflecting layer 32 and the protective layer 31 is carried out on the substrate 30. The alloy containing metals, such as gold, silver, aluminum, copper, or platinum, and these metals is used for a reflecting layer 32. Below, the example which forms the vision image which can be viewed by two or more record marks is shown in the optical disk 25 only for playbacks.

[0100] The optical disk 25 shown in drawing 16 (b) is a disk of the one side type with which the laminating of the vision image recording layer 33, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. The vision image recording layer 33 is a recording layer of the dedication in which the vision image which can be viewed by two or more record marks is formed. A laser beam is irradiated from a substrate 30 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and a reflecting layer 32 to view a vision image from a playback side side. In addition, suppose that the different wavelength or different laser beam reinforcement from the laser beam at the time of forming the laser beam and vision image at the time of reproducing data is used.

[0101] Moreover, the optical disk 25 shown in drawing 16 (c) is a disk of the one side type with which the laminating of a reflecting layer 32, the vision image recording layer 33, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a protective layer 31 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a protective layer 31 and a reflecting layer 32 to view a vision image from a contents information write-in field side.

[0102] The optical disk 25 shown in drawing 16 (d) is the combination mold of above-mentioned drawing 16 (b) and drawing 16 (c), and is a disk of the double-sided type with which the laminating of the 1st vision image recording layer 33, a reflecting layer 32, the 2nd vision image recording layer 33, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated by both sides of a disk and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the double-sided vision image recording layer 33. As mentioned above, it becomes possible by forming the 2nd vision image recording layer 33 between a protective layer 31 and a reflecting layer 32, and forming the 1st vision image recording layer 33 between a substrate 30 and a reflecting layer 32 to view a vision image from a contents information write-in playback side and field side.

[0103] The optical disk 25 shown in drawing 16 (e) is a disk of the double-sided type with which the laminating of a reflecting layer 32 and the 1st protective layer 31 is carried out to one substrate 30 side, and the laminating of the vision image recording layer 33 and the 2nd protective layer 31 is carried out to the another side side of a substrate 30. A laser beam is irradiated from the 2nd protective layer 31 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and the 2nd protective layer 31 to view a vision image from the playback side side in which the 2nd protective layer 31 is formed.

[0104] The optical disk 25 shown in drawing 16 (f) is a disk of the double-sided type with which the laminating of a reflecting layer 32, the 1st vision image recording layer 33, and the 1st protective layer 31 is carried out to one substrate 30 side, and the laminating of the 2nd vision image recording layer 33 and 2nd protective layer 31 is carried out to the another side side of a substrate 30. A laser beam is irradiated by both

sides of a disk and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the double-sided vision image recording layer 33. As mentioned above, it becomes possible by forming the 1st vision image recording layer 33 between the 1st protective layer 31 and a reflecting layer 32, and forming the 2nd vision image recording layer 33 between a substrate 30 and the 2nd protective layer 31 to view a vision image from both the playback side side. In addition, laminating patterns other than the above are sufficient as an optical disk 25.

[0105] There are a double-sided type whose both sides are record playback sides, and an one side type of the optical disks 25 in which record and ****** of data are possible whose field is a record playback side on the other hand and whose another side side is a contents information write-in field, for example, they are CD-R, DVD-R, DVD+R, etc.

[0106] As the optical disk 25 in which record and ****** of data are possible is shown in drawing 17 (a), the laminating of a reflecting layer 32 and the recording layer 34 is carried out. In addition, the above-mentioned optical disk 25 has the structure where a substrate 30 is stretched through the connection layer 37. Organic coloring matter, such as porphyrin system coloring matter, cyanine system coloring matter, azo system coloring matter, JIPIROMETEN system coloring matter, polymethylene system coloring matter, and naphthoquinone system coloring matter, is used for the recording layer 34. The example which forms the vision image which can be viewed by two or more record marks is shown in the optical disk 25 in which record and ****** of data are possible below.

[0107] The optical disk 25 shown in drawing 17 (b) is a disk of the one side type with which the laminating of the vision image recording layer 33, a recording layer 34, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a substrate 30 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and a recording layer 34 to view a vision image from a record playback side side. In addition, suppose that the different wavelength or different laser beam reinforcement from the laser beam at the time of forming the laser beam and vision image at the time of recording and reproducing data is used.

[0108] The optical disk 25 shown in drawing 17 (c) is a disk of the one side type with which the laminating of a recording layer 34, the vision image recording layer 33, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a substrate 30 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a reflecting layer 32 and a recording layer 34 to view a vision image from a record playback side side.

[0109] The optical disk 25 shown in drawing 17 (d) is a disk of the one side type with which the laminating of a recording layer 34, a reflecting layer 32, the vision image recording layer 33, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a protective layer 31 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming

the vision image recording layer 33 between a protective layer 31 and a reflecting layer 32 to view a vision image from a contents information write-in field side.

[0110] The optical disk 25 shown in drawing 17 (e) is a disk of the one side type with which the laminating of a recording layer 34 and the reflecting layer 32 is carried out, and the laminating of the vision image recording layer 33 is carried out through the connection layer 37, and has the structure where a substrate 30 is stretched. A laser beam is irradiated from the vision image recording layer 33 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and the connection layer 37 to view a vision image from a contents information write-in field side.

[0111] A recording layer 34, the vision image recording layer 33, and a reflecting layer 32 are the disks of the one side type by which the laminating is carried out, and the optical disk 25 shown in drawing 17 (f) has the structure where a substrate 30 is stretched. A laser beam is irradiated from a recording layer 34 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a reflecting layer 32 and a recording layer 34 to view a vision image from a record playback side side.

[0112] The vision image recording layer 33, a recording layer 34, and a reflecting layer 32 are the disks of the one side type by which the laminating is carried out, and the optical disk 25 shown in drawing 17 (g) has the structure where a substrate 30 is stretched. A laser beam is irradiated from the vision image recording layer 33 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and a recording layer 34 to view a vision image from a record playback side side.

[0113] The optical disk 25 shown in drawing 17 (h) is a disk of the double-sided type with which the laminating of the 1st recording layer 34 and 1st reflecting layer 32 is carried out, and the laminating of the 2nd reflecting layer 32, 2nd recording layer 34, and vision image recording layer 33 is carried out through the connection layer 37. A laser beam is irradiated from the vision image recording layer 33 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and the 2nd recording layer 34 to view a vision image from a contents information write-in field side.

[0114] The optical disk 25 shown in drawing 17 (i) is a disk of the double-sided type with which the laminating of the 1st vision image recording layer 33, the 1st recording layer 34, and the 1st reflecting layer 32 is carried out, and the laminating of the 2nd reflecting layer 32, the 2nd recording layer 34, and the 2nd vision image recording layer 33 is carried out through the connection layer 37. A laser beam is irradiated by both sides of a disk and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the double-sided vision image

recording layer 33. As mentioned above, it becomes possible by forming the 1st vision image recording layer 33 between a substrate 30 and the 1st recording layer 34, and forming the 2nd vision image recording layer 33 between a substrate 30 and the 2nd recording layer 34 to view a vision image from both the record playback side side. It supposes that laminating patterns other than the above are sufficient an optical disk 25, and the recording layer 34 may be multilayered. In addition, the vision image which can be viewed by two or more record marks to a recording layer 34 may be formed, without carrying out the laminating of the vision image recording layer 33. In this case, a vision image is formed in the data sheep record section of a recording layer 34.

[0115] There are a double-sided type which is the record playback side which can eliminate both sides, and an one side type of the optical disks 25 in which record and elimination of data are possible whose another side side it is the record playback side which can eliminate a field on the other hand, and is a contents information write-in field, for example, they are CD-RW, DVD-RW, DVD+RW, etc.

[0116] As the optical disk 25 in which record and elimination of data are possible is shown in drawing 18 (a), the laminating of a dielectric layer 35, a recording layer 36, a dielectric layer 35, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. The alloy ingredient which uses germanium, Sb, Te, etc. as the main raw material, and the phase change inorganic material of the alloy ingredient which uses Ag, In, Sb, and Te as the main raw material are used for the recording layer 36. The example which forms the vision image which can be viewed by two or more record marks is shown in the optical disk 25 in which record and elimination of data are possible below.

[0117] The optical disk 25 shown in drawing 18 (b) is a disk of the one side type with which the laminating of a dielectric layer 35, a recording layer 36, a dielectric layer 35, the vision image recording layer 33, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a substrate 30 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a reflecting layer 32 and a dielectric layer 35 to view a vision image from an eliminable record playback side side. In addition, suppose that the different wavelength or different laser beam reinforcement from the laser beam at the time of forming the laser beam and vision image at the time of recording, reproducing and eliminating data is used.

[0118] The optical disk 25 shown in drawing 18 (c) is a disk of the one side type with which the laminating of the vision image recording layer 33, a dielectric layer 35, a recording layer 36, a dielectric layer 35, a reflecting layer 32, and the protective layer 31 is carried out on the substrate 30. A laser beam is irradiated from a substrate 30 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and a dielectric layer 35 to view a vision image from an eliminable record playback side side.

[0119] The optical disk 25 shown in drawing 18 (d) is a disk of the one side type with which the laminating of a dielectric layer 35, a recording layer 36, a dielectric layer 35, and the 1st reflecting layer 32 is carried out, and the laminating of the 2nd reflecting layer 32 and vision image recording layer 33 is carried out through the connection layer 37. A

laser beam is irradiated from the vision image recording layer 33 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a substrate 30 and the 2nd reflecting layer 32 to view a vision image from a contents information write-in field side.

[0120] The optical disk 25 shown in drawing 18 (e) is a disk of the one side type with which the laminating of a dielectric layer 35, a recording layer 36, a dielectric layer 35, the vision image recording layer 33, and the reflecting layer 32 is carried out. A laser beam is irradiated from a dielectric layer 35 side, and, as for the above-mentioned optical disk 25, the vision image which can be viewed by two or more record marks is formed in the vision image recording layer 33. As mentioned above, it becomes possible by forming the vision image recording layer 33 between a reflecting layer 32 and a dielectric layer 35 to view a vision image from an eliminable record playback side side. It supposes that laminating patterns other than the above are sufficient an optical disk 25, and the recording layer 36 may be multilayered. In addition, the vision image which can be viewed by two or more record marks to a recording layer 36 may be formed, without carrying out the laminating of the vision image recording layer 33. In this case, a vision image is formed in the data sheep record section of a recording layer 36.

[0121] In addition, since information is read in a contents information write-in field and recognition of an optical disk 25 cannot be performed when carrying out incidence of the laser beam from a contents information write-in field side and forming a vision image, the data-logging regenerative apparatus 1 detects the existence of a disk by the sensor which senses the existence of insertion of an optical disk 25, and presupposes it that it distinguishes whether it is possible to form a vision image.

[0122] Moreover, the laminating of the sensible-heat layer may be carried out to an optical disk 25. A sensible-heat layer is a layer which causes a visual color change, when a laser beam is irradiated. Therefore, an optical disk 25 becomes possible [judging visually whether it is a used disk or it is an intact disk]. Moreover, it becomes possible to judge the use count of an optical disk 25 visually by preparing a two or more layers sensible-heat layer, and causing a different color change according to the count by which the laser beam was irradiated.

[0123] Moreover, as shown in drawing 19 , the configuration that the data storage area 200 and the vision image record section 202 are divided beforehand is sufficient as an optical disk 25. In such a configuration, you may make it the configuration which established the data storage area 200 in the inner circumference side, and established the vision image record section 202 in the periphery side, and may make it the configuration which established the vision image record section 202 in the inner circumference side, and established the data storage area 200 in the periphery side, and the vision image record section 202 and a data storage area 200 may make it the configuration prepared by turns.

[0124] Moreover, the data-logging regenerative apparatus 1 which applied this invention may form a vision image in an optical card by two or more record marks. Below, the example which forms a vision image in an optical card with the data-logging regenerative apparatus 1 is described.

[0125] As shown in drawing 20 , an optical card makes Field A the record playback field

for data, and Field B is constituted as a record section for a vision image. Like the case where a vision image is formed in an optical disk 25, the data-logging regenerative apparatus 1 generates a vision image, and forms a vision image in the field B of an optical card by two or more record marks. Moreover, Field A is divided into the record playback field for data, and the record section for a vision image, and the optical card may be constituted, as shown in drawing 21 .

[0126] Utilization as shown below by forming a vision image in an optical card with the data-logging regenerative apparatus 1 as mentioned above is possible.

[0127] It becomes possible to use an optical card as a business card by recording a firm name, an address, the telephone number, an identifier, the LOGO of a firm, a mail address, the homepage address, etc. as a vision image which can be viewed to an optical card.

[0128] It becomes that using as a consultation card is possible by making the information and the information which may be possible for viewing that it is troubled if the consultation record examined in the hospital is recorded on the record playback field for data, and it considers as the vision image which can view consultation time, reservation time, etc., it records on the record section for a vision image and it is viewed visually intermingled.

[0129] When software is downloaded through the Internet, it is possible to use an optical card as a memo pad by considering as the vision image which can view the serial number published in the case of download of software, and a password, and recording on the record section for a vision image of an optical card.

[0130] It is possible to use an optical card as a prepaid card by setting the usable amount of money, duration of a call, etc. as the optical card, considering as the vision image which can view the usable balance, usable duration of a call, an activity date, etc., and recording on the record section for a vision image of an optical card.

[0131] It is possible to use an optical card as a ticket by recording the access approach to an airdrome or the event hall etc. on the record playback field for data of an optical card, considering as the vision image which can view a boarding date, a commencement-of-a-performance date, the hall name, the seat number, etc., and recording on the record section for a vision image.

[0132] Moreover, since radial [the] differs by the inner circumference [of a disk], and periphery side when forming the vision image which can be viewed to an optical disk 25 or an optical card, and On/Off control of a laser beam is performed by the same time amount, distortion may arise in formation of a vision image. Then, distortion is amended by carrying out adjustable [of the irradiation time of a laser beam] according to a radius location by the inner circumference and periphery side, as shown in drawing 22 .

[0133] The data-logging regenerative apparatus 1 thus, by forming the vision image generated in the vision image generation section 24 in optical recording media, such as an optical disk 25 and an optical card, by two or more record marks Since a vision image does not disappear even if a blemish is sufficient for an optical recording medium just, and a contaminant adheres and it rubs, Since the mass eccentricity of a disk does not occur even if it can perform discernment of an optical recording medium always and forms the vision image which can be viewed, The data currently recorded can be reproduced and recorded at high speed. Again When an optical recording medium is possible for record and elimination of data, in order to be able to form eliminate the

vision image which can be viewed any number of times and to form in a data sheep record section the vision image which can be viewed, a problem does not arise in the present format, compatibility, etc.

[0134] Then, more concrete actuation at the time of recording the vision image (it also being hereafter called a visible image) which can be viewed to an optical disk 25 is explained using the flow chart shown in drawing 23 - drawing 28 .

[0135] Suppose that the host PC (Personal Computer) who does not illustrate is connected as an external instrument 23 which controls in generalization the data-logging regenerative apparatus 1 which explained the configuration using drawing 1 in the following explanation.

[0136] In order to record the vision image which can be viewed to an optical disk 25, as shown in drawing 23 , in a step ST 101, an optical disk 25 is first inserted in the predetermined part of the data-logging regenerative apparatus 1. The data-logging regenerative apparatus 1 performs the check disk process which distinguishes the class of optical disk 25 according to the optical disk 25 having been inserted.

[0137] Next, in a step ST 102, the data-logging regenerative apparatus 1 judges whether a vision image is recordable on the optical disk 25 concerned according to the activation result of the check disk in a step ST 101. When a vision image can be recorded on an optical disk 25, a process is advanced to a step ST 103, when unrecordable, a process is advanced to a step ST 105 and an error notification is outputted to the host PC who controls the data-logging regenerative apparatus 1.

[0138] In a step ST 103, according to the ability to record a vision image on an optical disk 25, the vision image record command for making a predetermined vision image record from Host PC is published, and it is outputted to the data-logging regenerative apparatus 1.

[0139] The data-logging regenerative apparatus 1 judges whether a vision image record command can be received and the received vision image record command can be executed, when it can perform, it advances a process to a step ST 104, when it cannot perform, advances a process to a step ST 105, and outputs an error notification to Host PC.

[0140] The data-logging regenerative apparatus 1 makes a vision image record on an optical disk 25 in a step ST 104 according to a vision image record command. When a vision image is correctly recorded on an optical disk 25, a process is ended, when record of a vision image goes wrong, a process is advanced to a step ST 105 and an error notification is outputted to Host PC.

[0141] The data-logging regenerative apparatus 1 is carried out in this way, and makes a vision image record on an optical disk 25. Then, the process performed at each step of the step ST 101 of drawing 23 , a step ST 102, a step ST 103, and a step ST 104 is explained to the detail.

[0142] First, the check disk process performed according to having inserted the optical disk 25 in a step ST 101 in the data-logging regenerative apparatus 1 is explained.

[0143] At a check disk process, first, the data-logging regenerative apparatus 1 detects the PCA field and PMA field which were explained by above-mentioned drawing 2 , when it is the medium which can record the inserted optical disk 25.

[0144] Moreover, the data-logging regenerative apparatus 1 detects a lead-in groove information field, a program field, and a lead-out information field, when data are

recorded on the optical disk 25.
[0145] Moreover, the data-logging regenerative apparatus 1 acquires the maximum lead-out information field start address from the special information inserted in the lead-in groove information field at 1 time of a rate at ten frames among ATIP(s) (Absolute Time In Pre-groove) which are the absolute time information currently recorded on the groove of an optical disk 25.
[0146] The data-logging regenerative apparatus 1 can know whether the data-information regenerative apparatus 1 can record data to the address of optical disk 25 throat by acquiring the maximum lead-out information field start address.
[0147] The data-logging regenerative apparatus 1 reads TOC information from the TOC field of the detected PMA field and a lead-in groove information field, and acquires the ending address of a last truck further again.
[0148] The data-logging regenerative apparatus 1 can know to which address data are recorded actually by reading the TOC information on a TOC field.
[0149] Moreover, the data-logging regenerative apparatus 1 can know whether the FAINA rise is carried out by whether TOC information is described by the TOC field, and can distinguish whether it is that the FAINA rise is carried out in the condition which can add whether it is that the FAINA rise is carried out in the condition [that the data currently further written in from the content of TOC information cannot add a postscript].
[0150] The data-logging regenerative apparatus 1 performs the above-mentioned actuation according to the optical disk 25 having been inserted, and reads the above-mentioned information directly. Host PC can acquire the above-mentioned information through the data-logging regenerative apparatus 1 in inputting a predetermined command.
[0151] For example, Host PC can acquire the maximum lead-out information field start address from the special information of Above ATIP with outputting a Read Atip Information command to the data-logging regenerative apparatus 1.
[0152] Moreover, Host PC can acquire TOC information with outputting the Read TOC command to the data-logging regenerative apparatus 1, and can know whether it is that the FAINA rise is carried out in the condition which can add whether it is that the FAINA rise is carried out in the condition [that a postscript cannot be added].
[0153] With outputting the Read PMA command and a Read Track Information command to the data-logging regenerative apparatus 1, Host PC can acquire the ending address of the truck of the very end currently recorded on the optical disk 25, and can know whether data are recorded by the optical disk 25 throat top further again.
[0154] Thus, a check disk process is performed by inserting an optical disk 25 in the data-logging regenerative apparatus 1, and Host PC can acquire the information acquired by the check disk process with outputting a predetermined command to the data-logging regenerative apparatus 1. Therefore, judgment whether visible data are recordable on an optical disk 25 can be made by either the data-logging regenerative apparatus 1 or the host PC.
[0155] Then, the process which judges whether a vision image is recordable on the optical disk 25 in a step ST 102 is explained using the flow chart shown in drawing 24 .
[0156] In a step ST 111, the data-logging regenerative apparatus 1 or Host PC investigates the record condition of an optical disk 25 first. At a process here, using the information acquired by the check disk process performed at a step ST 101, the optical

disk 25 actually inserted in the data-logging regenerative apparatus 1 concerned is what kind of disk, it judges whether a vision image is recordable, and when it can record, recordable storage capacity etc. is computed.
[0157] Here, it explains using the flow chart which shows the detail of the process of a step ST 111 to drawing 25 .
[0158] It sets to a step ST 121, and since optical disks usual in the list of the special information of ATIP differ, the data-logging regenerative apparatus 1 or Host PC judges whether it is the optical disk with which the optical disk 25 inserted in the data-logging regenerative apparatus 1 concerned was equipped with the visible image field which can record a vision image.
[0159] Moreover, the mark recorded on the predetermined field of an optical disk 25 is detected, and it judges whether it is the optical disk equipped with the visible image record section where the optical disk inserted in the data-logging regenerative apparatus 1 concerned can record a vision image.
[0160] When an optical disk 25 is judged to be the usual optical disk which advanced the process to step S122 when it was the optical disk equipped with the visible image record section, was not equipped with the visible image record section, but was equipped only with the data storage area, a process is advanced to a step ST 123.
[0161] Here, the optical disk equipped with a different visible image record section from the usual optical disk using drawing 29 is explained. The optical disk equipped with the visible image record section is an optical disk secured to the periphery of an optical disk as the visible image record section for recording a vision image beforehand shows drawing 29 .
[0162] As shown in drawing 29 , although the optical disk equipped with the visible image record section is equipped with the data storage area which usually records data, and the visible image record section, between this data storage area and a visible image record section, the No ATIP field where ATIP does not exist is prepared.
[0163] Since this will usually record data even on the visible image record section which is an exclusive field for recording a vision image if the No ATIP field where ATIP does not exist as mentioned above has not prepared when it is drive equipment which carried the Over Burn function which is a function to in_which the data-logging regenerative apparatus 1 records till the place where a lead-out information record-section start address is disregarded at, and ATIP does not exist, in order to prevent this, a No ATIP field is prepared.
[0164] Moreover, the No LPP field without LPP (Land Pre-Pit) which is absolute time information, or the No ADIP field without ADIP (Address In Pre-groove) which is similarly absolute time information may be prepared.
[0165] Thus, in the case of the optical disk which prepared the visible image record section beforehand, as shown in drawing 30 , even when the optical disk is dedicated in the case by forming some cases for conveying the optical disk concerned with transparent construction material, the above-mentioned visible image record section can be checked.
[0166] Moreover, when the visible image record section is beforehand established in the optical disk, management of an optical disk etc. can be easily performed by recording a bar code on the above-mentioned visible image record section.
[0167] In a step ST 122, the data-logging regenerative apparatus 1 or Host PC asks for the record possible capacity Ce and the recordable start address Ae of the visible image

record section established in the optical disk 25.
[0168] In a step ST 123, based on special information, the data-logging regenerative apparatus 1 or Host PC controls the OP section 10, and seeks from a lead-out information field start address to the field for 5 minutes.
[0169] In a step ST 124, the data-logging regenerative apparatus 1 or Host PC judges whether ATIP exists in the location of the optical disk 25 sought at a step ST 123. When ATIP exists, it judges that a visible image record section exists, and a process is advanced to a step ST 122, when ATIP does not exist, it judges that a visible image record section does not exist, and a process is advanced to a step ST 125.
[0170] In a step ST 125, the data-logging regenerative apparatus 1 or Host PC judges whether the FAINA rise of the data written in the program field of an optical disk 25 is carried out by whether the TOC information on a TOC field was detected at the check disk process.
[0171] The data-logging regenerative apparatus 1 or Host PC judges that the FAINA rise is carried out by TOC information having been detected, advances a process to a step ST 127, judges that a FAINA rise is not carried out by TOC information not having been detected, and advances a process to a step ST 126.
[0172] In a step ST 126, the data-logging regenerative apparatus 1 or Host PC does the FAINA rise of the data by which a FAINA rise is not carried out, and computes the capacity which can record a visible image, and a recordable start address.
[0173] At this time, two patterns in the case where cannot add a postscript and a FAINA rise is carried out, and the case of a postscript being possible and carrying out a FAINA rise can be considered.
[0174] When a postscript cannot be added and a FAINA rise is carried out, it will be secured as a field which it becomes impossible for a periphery part to write in data from the lead-out information field written in, and records a visible image with a lead-in groove information field.
[0175] It asks for the record possible capacity calcium and the recordable start address Aa of a visible image at the time of being unable to add a postscript and carrying out a FAINA rise. Since the die length of the lead-out information field of a single-session is 30 seconds per minute when the start address of the lead-out information field of the recorded outermost periphery which is acquired from TOC information is set to LOSA, it becomes 1 minute 30(second) x75(frames per second) =6750 frame.
[0176] Therefore, in the address after LOSA+6750, it can judge that nothing is recorded, and the recordable start address Aa becomes LOSA+6750 to it.
[0177] Next, a capacity recordable on the physical target of an optical disk 25 is computed. If the maximum lead-out information field start address which the optical disk 25 acquired from the special information mentioned above permits is set to ALOSA, ALOSA+6750 will become the maximum address which can record an optical disk 25.
[0178] The record possible capacity calcium serves as (ALOSA+6750)-(LOSA+6750) =ALOSA-LOSA from this.
[0179] Since data can be further written in a periphery part from a lead-out information field on the other hand when a postscript can be added and a FAINA rise is carried out, the truck which wrote in the visible image data which data-ized the visible image is generable. A visible image data is data in which it was shown what kind of image the visible image recorded on an optical disk 25 is. It can know what kind of thing the visible

image recorded on the optical disk 25 is, without seeing the recording surface of an optical disk 25 because a user reads a visible image data. The truck which wrote in the visible image data cannot be added and a FAINA rise is carried out.
[0180] In case a visible image data is recorded, the data in which it is shown that it is a visible image, the start address on which the visible image is recorded, and the end address are also recorded.
[0181] The start address on which this visible image is recorded, and the address are recordable on a PMA field. The data-logging regenerative apparatus 1 can know the record range of a visible image data by leading the start address recorded on the PMA field, and the address. In case a start address and the address are recorded on PMA, the format which can distinguish differing from the usual truck is described.
[0182] PMA is a field which holds temporarily the information on the disk which has not carried out a FAINA rise, and in the case of CD-R media, as shown below, it is defined by Orange Book PERT 3, and Vol2 and Ver1.10.
[0183] PMA -- Mode0:Reserved and the start time of a Mode1:truck -- and the information on ID of a time and a Mode2:disk, and the class (CD-ROM or CD-I or CD-XA) of disk and Mode3: -- information, such as information on the truck to skip, information on the truck skipped un-[Mode4:], a Mode5:skip time interval, Mode6:a non-skipping time interval, and Mode7-FF:Reserved, is recorded.
[0184] Moreover, in the case of CD-RW media, as shown below, it defines as Orange Book PERT 3, and Vol2 and Ver1.10.
[0185] In PMA, it is Mode0:Erase. The information on Pattern, the start time of a Mode1:truck, ID of an end time and a Mode2:disk, and the class (CD-ROM or CD-I or CD-XA) of disk, the information on the truck of which a Mode3:skip is done, Mode4:Reserved, Mode5: The information of the time amount and Mode6-FF:Reserved which are not reproduced is recorded.
[0186] The PMA field has composition as shown in drawing 31 , and each Mode is identified by the bit equivalent to each Mode mentioned above to Control being assigned. The information on being a visible image is described by the field of for example, Mode6-FF.
[0187] For example, as a truck of Mode1, data begin from "IMAGE" and it continues with the start address on which the visible image is recorded next, and the end address, and when a visible image is alphabetic data further, the corresponding ASCII code is recorded. The remainder is recorded in a format which is fill uped with FF.
[0188] Then, when a postscript can be added and a FAINA rise is carried out, it asks for the record possible capacity Cb and the recordable start address Ab of a visible image.
[0189] When a postscript can be added, it is surely a multi-session. The lead-out information field of the beginning of a multi-session is 30 seconds per minute. Moreover, as for the truck for writing in a visible image data, min also becomes ** to which the 4500 die length (1 minute x75) of a lead-in groove information field and the 6750 die length of a lead-out information field are added by 4 seconds, i.e., 300 frames, being needed, and adding a truck further.
[0190] Therefore, if the start address of the lead-out information field of the recorded outermost periphery which is acquired from TOC information is set to LOSA, the recordable start address Ab will be set to (LOSA+6750)+4500+300+2250.
[0191] Next, storage capacity is computed on the physical target of an optical disk 25. If

the maximum lead-out information field start address which the optical disk 25 acquired from the special information mentioned above permits is set to ALOSA, ALOSA+6750 will become the maximum address which can record an optical disk 25.
[0192] The record possible capacity Cb becomes (ALOSA+6750)- (LOSA+6750) (+4500+300+2250) from this.
[0193] Whether a postscript's not being added and a FAINA rise's being carried out and a postscript are possible, it is determined by the record possible capacity of an optical disk 25, and when there is not sufficient storage capacity for recording a visible image data, it cannot add whether a FAINA rise is carried out and a FAINA rise is carried out.
[0194] In a step ST 127, the data-logging regenerative apparatus 1 or Host PC cannot add a postscript, and judges whether the FAINA rise is carried out. When cannot add a postscript, a process cannot be advanced to a step ST 128 when a FAINA rise is not carried out, and a postscript cannot be added and the FAINA rise is carried out, a process is advanced to a step ST 129.
[0195] In a step ST 128, when a postscript can be added and the FAINA rise is carried out, since the data-logging regenerative apparatus 1 or Host PC needs to generate a truck into a periphery part, cannot add a postscript to it further and needs to do a FAINA rise to it, he computes the capacity which can record a visible image, and a recordable start address in consideration of this from a lead-out information field. The recordable start address Ac is set to (LOSA+6750)+4500+300+2250, and the record possible capacity Cc becomes (ALOSA+6750)- (LOSA+6750) (+4500+300+2250). Moreover, a truck can newly be used as the truck which wrote in the visible image data which data-ized the visible image here.
[0196] In a step ST 129, since the FAINA rise of the data-logging regenerative apparatus 1 or the host PC is carried out in the condition [that a postscript cannot be added], he computes the capacity which can record a visible image, and a recordable start address. The recordable start address Ad is set to LOSA+6750, and the record possible capacity Cd serves as (ALOSA+6750)-(LOSA+6750) =ALOSA-LOSA.
[0197] However, also when the 6750 or more die length of a lead-out information field is recorded actually, for a certain reason, data search to which address it is recorded actually [the data-logging regenerative apparatus 1] to an optical disk 25. For example, a lead is performed from the address which can record an optical disk 25, and the existence of a RF signal is investigated to the address of the last of a disk. The address of the RF signal detected at the end turns into the address which can record a degree. Moreover, Host PC can acquire this detected information with outputting a command to the data-logging regenerative apparatus 1.
[0198] Thus, the record condition of an optical disk 25 can be investigated by performing a step ST 121 - a step ST 129.
[0199] Again, the process after return and a step ST 112 is explained to the flow chart of drawing 24 .
[0200] In a step ST 112, the data-logging regenerative apparatus 1 or Host PC judges whether the vision image is recorded.
[0201] In a step ST 112, the data-logging regenerative apparatus 1 seeks to the recordable start address Ax (x is a, b, c, or d) for which it asked at the step ST 111 of an optical disk 25.
[0202] In a step ST 113, the data-logging regenerative apparatus 1 leads an optical disk

25 from the sought recordable start address Ax.
[0203] In a step ST 114, the data-logging regenerative apparatus 1 or Host PC judges whether the RF signal was detected. When a RF signal is detected, a process is advanced to a step ST 115, and when a RF signal is not detected, a process is advanced to a step ST 116.
[0204] In a step ST 115, the data-logging regenerative apparatus 1 or Host PC determines that it is impossible to record visible data.
[0205] In a step ST 116, the data-logging regenerative apparatus 1 or Host PC judges whether ATIP was lost or not. When ATIP is lost, a process is advanced to a step ST 117, when ATIP exists, a process is returned to a step ST 114 and a lead is continued.
[0206] When it is shown that the led part is a recordable field when there is ATIP and there is no ATIP, it is shown that the led part is not a recordable field.
[0207] In a step ST 117, the data-logging regenerative apparatus 1 or Host PC judges that the visible image is not recorded on the record section which begins from the recordable start address Ax sought at a step ST 112. Moreover, the data-logging regenerative apparatus 1 or Host PC acquires the recordable last address Bx which shows the last address of a recordable field from the led result.
[0208] In a step ST 118, visible image record possible capacity judges whether it is zero from the recordable last address Bx which the data-logging regenerative apparatus 1 or Host PC acquired at a step ST 117. When visible image record possible capacity is zero, a process is advanced to a step ST 115, and when it is not zero, a process is advanced to step S115.
[0209] In a step ST 119, the data-logging regenerative apparatus 1 or Host PC determines [that visible data are recordable on the record section which begins from the recordable start address Ax, and].
[0210] Thus, the data-logging regenerative apparatus 1 or Host PC investigates the record condition of an optical disk 25 by ST111 using the various information currently recorded on the optical disk 25, and it judges [whether visible data are recordable by leading the record section of an optical disk 25 still more nearly actually, and].
[0211] Next, actuation at the time of a vision image record command being transmitted is explained using the flow chart shown in drawing 26 from the host PC in the step ST 103 of the flow chart shown in drawing 23 .
[0212] In ST131, Host PC starts visible image record application according to directions of a user. In case visible image record application records a visible image on an optical disk 25, it is application software which controls Host PC and the data-logging regenerative apparatus 1.
[0213] By using visible image record application, a user can input into an optical disk 25 the alphabetic data of the request made to record as a visible image, or can perform actuation of the layout adjustment on the optical disk 25 of the inputted alphabetic data etc. simple by GUI (Graphical User Interface).
[0214] A user will input visible image datas, such as alphabetic data (ASCII code) which Host PC is made to record on an optical disk 25 as a visible image from a keyboard etc., if visible image record application is started.
[0215] Moreover, bit map data can also be used as a visible image data.
[0216] Furthermore, a user also inputs the information which specifies smallness into the record start address which specifies the address of the optical disk 25 on which the visible

image data to input is made to record and the size information on alphabetic data, for example, size.
[0217] A user demands issuance of the vision image record command which makes record start, after the input of information required to record a visible image on an optical disk 25 is completed based on directions of visible image record application.
[0218] According to a demand, visible image record application publishes a vision image record command, and outputs it to the data-logging regenerative apparatus 1 with alphabetic data, a record start address, and alphabetic data size information.
[0219] Moreover, the CD-TEXT information currently recorded on the TOC field of an optical disk 25 is also recordable as a visible image. In this case, according to the directions from Host PC, reading appearance of the CD-TEXT information is carried out for the data-logging regenerative apparatus 1 from a TOC field.
[0220] In a step ST 132, the data-logging regenerative apparatus 1 checks the alphabetic data inputted by the user. For example, the number of alphabetic characters of the inputted alphabetic data distinguishes whether it is less than the record good Takafumi number of letters in the specified character size to the record section which begins from the specified address.
[0221] When the number of alphabetic characters of alphabetic data is over record good Takafumi number of letters, a process is advanced to a step ST 105, an error notification is transmitted to Host PC, and a user is told about that. Moreover, in within record good Takafumi number of letters, a process is advanced to a step ST 133.
[0222] In addition, the visible image record application started by Host PC may perform this process.
[0223] In a step ST 133, the data-logging regenerative apparatus 1 checks the recordable field of an optical disk 25. The data-logging regenerative apparatus 1 judges whether the record start address inputted by the user is in the recordable field of a visible image. If a record start address is outside [recordable] a field, it will advance a process with a step ST 105, will transmit an error notification to Host PC, and will tell a user about that. Moreover, if a record start address is in [recordable] a field, a process will be advanced to a step ST 134.
[0224] In addition, the visible image record application started by Host PC may perform this process.
[0225] In a step ST 134, it judges whether the data-logging regenerative apparatus 1 has the storage capacity which can memorize the alphabetic data of the inputted number of alphabetic characters from a record start address, alphabetic data size information, and the number of alphabetic data.
[0226] The number of alphabetic characters of the alphabetic data recorded on an optical disk 25 depends for alphabetic data on in what size it records.
[0227] For example, the vision image data obtained by changing the visible image data mentioned later is considered as the matrix of mxm. If that SA and record of a recordable start address are possible and the address are set to LA, a track pitch is set to P and the radius of the optical disk 25 of V and the address 00:00:00 is set to r0 for linear velocity The radius location RSA of SA becomes RSA=root (SAxmxP) (/75/pi+r 0xr0), and the radius location LSA of LA becomes LSA=root (LAxVxP) (/75/pi+r 0xr0). In addition, they are r0=25mm, P = 1 or 6 micrometers, and V=1.2 m/s.
[0228] For example, if it is LSA-RSA>b when making a character image into the size of

a [cm] and a[cm] xb [cm] radially set to b [cm] at a circumferencial direction, it will become recordable [a character image] and the number of character images recordable [with (2x RSAxpi) / a] will be computed.

[0229] When sufficient storage capacity to record the inputted alphabetic data is in an optical disk 25, a process is advanced to a step ST 104, when there is no sufficient storage capacity, a process is advanced to a step ST 105, an error notification is transmitted to Host PC, and a user is told about that.

[0230] In addition, the visible image record application started by Host PC may perform this process.

[0231] Next, it explains using the flow chart which shows the visible image in the step ST 104 of the flow chart shown in drawing 23 to drawing 27 about the actuation at the time of recording on an optical disk 25.

[0232] In a step ST 141, the data-logging regenerative apparatus 1 or Host PC judges whether the FAINA rise of the data currently recorded on the program field of an optical disk 25 is carried out. When a FAINA rise is not carried out, a process is advanced to a step ST 142, and when the FAINA rise is carried out, a process is advanced to a step ST 143.

[0233] In a step ST 142, the data-logging regenerative apparatus 1 or Host PC judges whether the data by which a FAINA rise is not carried out cannot be added and a FAINA rise is carried out. When a postscript cannot be added and it carries out a FAINA rise, a process is advanced to a step ST 144, and when a postscript cannot be added and it does not carry out a FAINA rise, a process is advanced to a step ST 145.

[0234] In a step ST 143, the data which a FAINA rise is carried out and are recorded on the optical disk 25 cannot add the data-logging regenerative apparatus 1 or Host PC, and he judges whether the FAINA rise is carried out. When cannot add a postscript, a process cannot be advanced to a step ST 145 when a FAINA rise is not carried out, and a postscript cannot be added and the FAINA rise is carried out, from a lead-out information field, it means being ready for recording a visible image on a periphery side, and a process is advanced to a step ST 146.

[0235] In a step ST 144, the data-logging regenerative apparatus 1 or Host PC cannot add the data currently recorded on the optical disk 25, does a FAINA rise, does improper [of a lead-in groove information field and the lead-out information field], and closes a session.

[0236] It means being ready for recording a visible image on a periphery side by this from the lead-out information field of the data recorded on the program field of an optical disk 25.

[0237] In a step ST 145, the data-logging regenerative apparatus 1 or Host PC can add the data currently recorded on the optical disk 25, does a FAINA rise, he cannot generate the truck of the predetermined amount of data, for example, the truck which recorded the visible image data, further after that, cannot add a postscript, and does a FAINA rise.

[0238] It means being ready for recording a visible image on a periphery side from the lead-out information field of the truck which recorded the visible image data in an optical disk 25 by this.

[0239] In a step ST 146, the data-logging regenerative apparatus 1 or Host PC records a visible image.

[0240] It explains using the flow chart which shows the record process of the visible

image in a step ST 146 to drawing 28 .
[0241] Here, the criteria of the timing at the time of recording a visible image on an optical disk 25 are explained first. The criteria of timing which an optical disk 25 records are defined based on FG pulse signal (it is hereafter called FG pulse) which a spindle motor 17 outputs. The spindle motor 17 is outputting Z times of pulses, while taking 1 round. Therefore, while taking 1 round, it counts from 0 to Z-1, and considers as the criteria of the timing which records the time of the count of this FG pulse being set to 0. FG pulse is counted by CPU19.
[0242] It is possible that Z division of the record section of an optical disk 25 is done by Z times of FG pulses to zero to Z-1 as shown in drawing 32 since FG pulse is outputted at equal intervals.
[0243] If the direction of Y and the hand of cut of an optical disk 25 are made into the direction of X for radial [of y and an optical disk 25], the value which shows what round radial predetermined distance was set to r from the core of an optical disk 25, and x and a truck carried out the number of partitions of the periphery of an optical disk 25 (Twopir [cm]/x) Coordinate space as shows the area calculated by x (1.6 [mum] xy) to drawing 33 made into one point (1dot) can be set up on an optical disk 25. In addition, 1.6 [mum] is a track pitch. Drawing 34 is drawing which expanded drawing 33 . Here, between FG pulses is divided into seven in the direction of X as an example.
[0244] For example, it supposes that one alphabetic data was changed into the vision image data of a mxm matrix, and the case where this vision image data is recorded in 1cmx1cm size on an optical disk 25 is considered.
[0245] In this case, the value of x and y becomes x=mand2pir [cm], and y= 1/(1.6 [mum] -m), respectively. Moreover, if time amount which carries out a radius r location 1 round is set to T, the time amount t by which laser is irradiated in the forming-1dot case will become t=T/(mand2pir).
[0246] Since the time amount T which carries out a radius r location 1 round changes with rotational speed of a spindle motor 17, circumferential measurement is carried out every and it is updated. A value becomes large, so that time amount T goes to the periphery of an optical disk 25.
[0247] In a step ST 151, the data-logging regenerative apparatus 1 changes a visible image data into a vision image data in the vision image generation section 24. Considering recording the alphabetic character A on an optical disk 25 as a visible possible condition, a vision image data comes to be shown in drawing 35 . The vision image data shown in drawing 35 is bit map data of seven line x7 train, sets to "1" the part where data exist, and is setting to "0" the part where data do not exist. For example, laser radiation is set to OFF in the part set to "0" in which the part set to "1" in which data exist is set to ON, and data do not exist laser radiation in it.
[0248] In a step ST 152, the data-logging regenerative apparatus 1 is sought to the record start address which is the address of the optical disk 25 of the part which starts record of the changed vision image data.
[0249] In a step ST 153, CPU19 of the data-logging regenerative apparatus 1 initializes the truck number counter which counts what round the truck took, and sets it to 0. Moreover, CPU19 initializes the value R of the direction dot counter of Y to count, and sets for the truck to have gone around by 1dot in the direction of Y to 0.
[0250] In a step ST 154, CPU19 will be in a standby condition until the number of counts

of FG pulse is set to Z-1.
[0251] In a step ST 155, CPU19 starts the timer 1 of CPU19 according to the number of counts of FG pulse having been set to Z-1. This timer 1 is used for measuring the time amount T which carries out r location 1 round the half year mentioned above.
[0252] In a step ST 156, CPU19 will be in a standby condition until the count of FG pulse is set to 0.
[0253] In a step ST 157, CPU19 increments only one value of a truck number counter according to the count of FG pulse having been set to 0.
[0254] In a step ST 158, CPU19 increments only one value of the direction dot counter of Y according to the value of a truck number counter having become a part for 1dot. Moreover, according to the value of the direction dot counter of Y having counted up, the value of a truck number counter is set to 0, and is reset.
[0255] As for CPU19, in a step ST 159, the value of the direction dot counter of Y judges whether it was set to m the maximum of the line of a vision image-data matrix, i.e., the case of a mxm matrix. For example, it judges whether in the case of the vision image data of 7x7 matrices shown in drawing 35 , it was set to 7.
[0256] For example, that the value of the direction dot counter of Y which counts up a truck because it takes y round was set to m when a vision image data was a mxm matrix means that the data-logging regenerative apparatus 1 concerned recorded all vision image datas. Therefore, if the value of the direction dot counter of Y is set to m, a process is ended, and when it is below m, a process will be advanced to a step ST 160.
[0257] In a step ST 160, the count of FG pulse is set to 0, and CPU19 stops a timer 1 according to the increment only of the one value of a truck number counter having been carried out, and makes the measuring time of this event the time amount T which carries out the location of a radius r 1 round.
[0258] In a step ST 161, CPU19 loads the vision image data changed from the visible image data at a step ST 151 from the vision image-data generation section 24. By when setting the matrix of a vision image data to (Ax, By) is set to 1.
[0259] In a step ST 162, further, CPU19 loads = (Ax, Bx) (m-R, By), when the vision image-data matrix concerned is mxm about the vision image data read at a step ST 161. For example, in 7x7 procession, as shown in drawing 35 , a vision image data loads = (Ax, Bx) (7 1), supposing the values of the direction dot counter of Y are R= 0 and By=1.
[0260] In a step ST 163, CPU19 starts a timer 2 further with a timer 1. The timer 2 has measured irradiation time t=T/(mand2pir) of laser.
[0261] In a step ST 164, CPU19 turns OFF laser, when (Ax, Bx) of the loaded vision image data are 0, and when it is 1, it controls the OP section 10 to set laser to ON.
[0262] In a step ST 165, CPU19 will be in a standby condition until the irradiation time t of laser becomes T/(mand2pir).
[0263] In a step ST 166, CPU19 stops the timer of CPU2 according to the irradiation time of laser having become t=T/(mand2pir).
[0264] In a step ST 167, as for CPU19, only 1 increments the value of By.
[0265] In a step ST 168, when the matrix of a vision image data is mxm, CPU19 judges whether By is larger than m, when small, it returns a process to a step ST 162, and when large, it advances a process to a step ST 19.
[0266] In a step ST 169, CPU19 will be in a standby condition until the count of FG pulse returns again.

[0267] In a step ST 170, according to the count of FG pulse having been again set to 0, a timer 1 is stopped and let the measuring time of this event be the time amount T which carries out the location of a radius r 1 round.
[0268] In a step ST 171, when all vision image datas are recorded, a process is returned to step S154, and when all are not recorded, a process is returned to a step ST 161.
[0269] Thus, the data-logging regenerative apparatus 1 can record a visible image on an optical disk 25 by controlling the timing of record based on FG pulse.
[0270] In addition, in above-mentioned explanation, although it enables it to record the data of one character corresponding to the number of FG pulses in case alphabetic data is recorded, this invention is not limited to this, can also be recorded two or more characters by one FG pulse, and can also record one character by two or more FG pulses.
[0271] Although above-mentioned explanation defined coordinate space using FG pulse, coordinate space can also be defined on the basis of the address.
[0272] For example, since die length of one frame and linear velocity were decided to the truck in the case of the CLV (Constant Linear Velocity) method which makes regularity relative velocity (linear velocity) of a read-out head, if the address used as criteria is defined, other addresses can calculate where it comes for a coordinate location.
[0273] For example, as shown in drawing 36 , supposing it records data from Address A, a radix point coordinate will serve as sync. Therefore, the coordinate on one of the directions of y of the sync location of Address A serves as a location shown with the slash of the address A+3, and can be computed by count.
[0274] Moreover, although coordinate space as shown in drawing 33 was defined using a matrix as a vision image data, this is effective when making processing simple. However, since the optical disk 25 is circular and the direction component of X of a periphery truck becomes large, when it considers as a visible image, balance may worsen.
[0275] Then, as the visible image data of a sector as shown in drawing 37 is prepared and it is shown in drawing 38 , the badness of balance is avoidable by defining the coordinate space which made the same the die length of dot of the direction of X.
[0276] furthermore -- moreover, a visible image is also recordable by defining a position coordinate to an optical disk 25, as shown in drawing 39 , and sending the information (for example, it smearing away (laser-on) -- not smearing away (laser-off) -- obtaining -- it being -- information) over a coordinate and its coordinate. If a visible image data is used as bit map data, a visible image is recordable on the location of the arbitration of an optical disk 25.
[0277] since the coordinate (a, a+1) and coordinate (a+1, a) which are not smeared away since a coordinate (a, a) is between trucks as shown in drawing 39 (laser-off), and a coordinate (a+1, a+1) are all over a truck -- smearing away (laser-on) -- it becomes be.
[0278] Moreover, a visible image is also recordable as one truck. Since the FAINA rise needs to be carried out in the condition which can be added when recording data as a truck, the process of which a postscript is made improper is skipped in the flow chart shown by drawing 27 mentioned above. To treat a visible image as a truck, it is necessary to record the start address of a truck, and the address on PMA.
[0279] Furthermore, to record as a truck, it is necessary to also record TDB (PAUSE part). Into this TDB, the visible image data which shows what kind of data the visible image recorded on the optical disk 25 is is also recordable. The data-logging regenerative apparatus 1 can recognize that it is a visible clothes mail truck by leading this TDB. An

error is returned when there is an access request to the truck which recorded the visible image from Host PC.
[0280] visible, in order to avoid an output for an error by the lead demand from Host PC at the difference in the content of the data which do not express a visible image but are recorded in ON of laser, and OFF -- a visible image is recorded as it is possible. For example, physical visible conditions differ in the part which recorded zero data, and the part which recorded one data altogether. Also when the visible image was recorded, and the physical property and the format property of having **(ed) to the Orange Book can be fulfilled and it treats as a truck using this property, actuation of the data-logging regenerative apparatus 1 does not become an error.
[0281] Thus, if it records on an optical disk 25 by using a visible image as a truck, after recording a visible image, it will also become possible to record the usual data tracks.
[0282] In addition, when CD-RW is used as an optical disk 25, it is also possible to eliminate the recorded visible image freely, and a new visible image or the new usual data can be recorded on the eliminated field.
[0283] This invention can also make a character image for example, a 90-degree revolution, rotating 180 degrees and being recognized as a character image, and record, although it is made to record that the character image recorded on an optical disk 25 can be seen from the core of an optical disk 25, and can be recognized as an alphabetic character by above-mentioned explanation further again, without being limited to this.
[0284] Moreover, in the above-mentioned explanation, although the vision image data was dealt with as a matrix of mxm, this is taken as a thing good also as a matrix of mxn according to the aspect ratio of a vision image data.
[0285] Moreover, although the part which turned ON laser radiation in the part set to "1" in which data exist, and was set to "0" in which data do not exist explained that laser radiation was turned OFF when the vision image data shown in drawing 35 was recorded Conversely, laser radiation may be turned ON in the part which turned OFF laser radiation in the part set to "1" in which data exist, and was set to "0" in which data do not exist.
[0286] Moreover, in case a vision image data is recorded, when especially recording an alphabetic character etc., it sets. Some specific sections of all of the inside which did Z division of a periphery by FG pulse in order to make the head of the recorded alphabetic character easy to find it easily are set to "1". Turn ON laser radiation or Or Sync shall be made from preparing the section which sets the specific section in the reverse to "0", and sets laser radiation to OFF.
[0287]
[Effect of the Invention] As explained to the detail above, the optical recording medium concerning this invention Since it is formed of two or more record marks, the vision image which can be viewed Since a vision image does not disappear even if a blemish is sufficient for an optical recording medium just, and a contaminant adheres and it rubs, Since the mass eccentricity of a disk does not occur even if it can perform discernment of an optical recording medium always and forms the vision image which can be viewed, The data currently recorded can be reproduced and recorded at high speed. Again When an optical recording medium is possible for record and elimination of data, in order to be able to form eliminate the vision image which can be viewed any number of times and to form in a data sheep record section the vision image which can be viewed, a problem

does not arise in the present format, compatibility, etc.
[0288] Moreover, the optical recording medium concerning this invention can record the vision image which can be viewed by being unable to form a new truck in the optical recording medium by which can add a postscript and the FAINA rise is carried out, being unable to add a postscript to it, and carrying out a FAINA rise to it.
[0289] moreover, the vision image in which what kind of viewing on the optical recording medium concerned is possible is recorded on which record section by recording the data which specify the vision image in which the above-mentioned viewing is possible as the formed truck -- or it makes it possible to provide a user with the information whether it is recorded.
[0290] Furthermore, the optical recording medium applied to this invention again can make the vision image which can be viewed to the optical recording medium concerned record as a truck, is extending the present format slightly and enables the activity of the optical recording medium concerned.
[0291] As explained to the detail above, the recording device concerning this invention Since the vision image which can be viewed is formed in an optical recording medium by two or more record marks Since a vision image does not disappear even if a blemish is sufficient for an optical recording medium just, and a contaminant adheres and it rubs, Since the mass eccentricity of a disk does not occur even if it can perform discernment of an optical recording medium always and forms the vision image which can be viewed, The data currently recorded can be reproduced and recorded at high speed. Again When an optical recording medium is possible for record and elimination of data, in order to be able to form eliminate the vision image which can be viewed any number of times and to form in a data sheep record section the vision image which can be viewed, a problem does not arise in the present format, compatibility, etc.
[0292] Moreover, the recording device concerning this invention can record the vision image which can be viewed by being unable to form a new truck in the optical recording medium by which can add a postscript and the FAINA rise is carried out, being unable to add a postscript to it, and carrying out a FAINA rise to it.
[0293] moreover, the vision image in which what kind of viewing on an optical recording medium is possible is recorded on which record section by recording the data which specify the vision image in which the above-mentioned viewing is possible as the formed truck -- or it makes it possible to provide a user with the information whether it is recorded.
[0294] Furthermore, the recording apparatus applied to this invention again can make the vision image which can be viewed to an optical recording medium able to record as a truck, and the above-mentioned optical recording medium can be used for it by extending the present format slightly.
[0295] Moreover, since the record approach concerning this invention forms the vision image which can be viewed to an optical recording medium by two or more record marks Since a vision image does not disappear even if a blemish is sufficient for an optical recording medium just, and a contaminant adheres and it rubs, Since the mass eccentricity of a disk does not occur even if it can perform discernment of an optical recording medium always and forms the vision image which can be viewed, The data currently recorded can be reproduced and recorded at high speed. Again When an optical recording medium is possible for record and elimination of data, in order to be able to

form eliminate the vision image which can be viewed any number of times and to form in a data sheep record section the vision image which can be viewed, a problem does not arise in the present format, compatibility, etc.

[Translation done.]

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SONY CORP

(72)Inventor : TAKASE TSUNEMITSU
SASAKI TAKASHI
MORIKAZU MUNETOSHI

(30)Priority

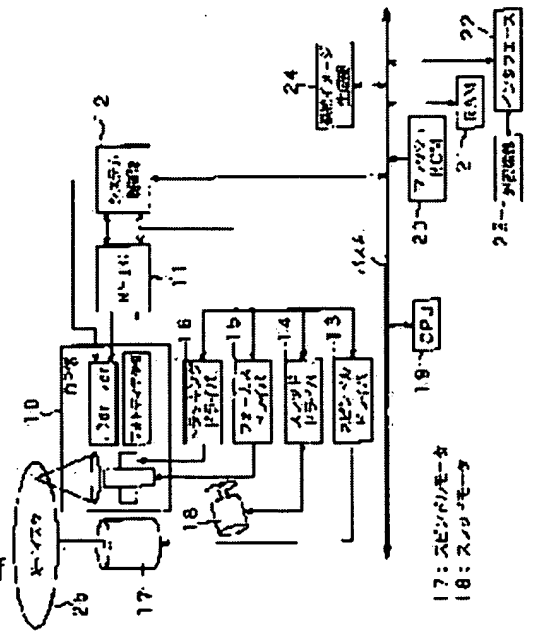
Priority number : 2001165913 Priority date : 31.05.2001 Priority country : JP

(54) OPTICAL RECORDING MEDIUM, RECORDER AND RECORDING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To form the visible visual sensation image on an optical recording medium.

SOLUTION: A laser beam emitting part 10 for irradiating an optical recording medium 25 with the laser beam and a visual sensation image conversion part 24 for converting the visual sensation image are furnished for realizing this subject in such a manner that the visual sensation image converted by the visual sensation image conversion part 24 is supplied to the laser beam emitting part 10, and the visual sensation image having the visible size is formed with a plurality of recording marks on the optional position or the specified position of the optical recording medium 25 by the laser beam emitting part 10.



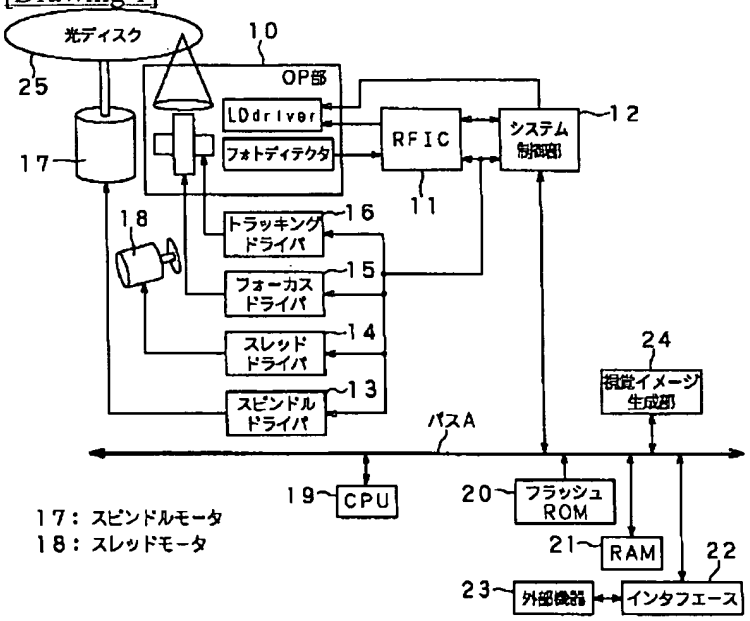
LEGAL STATUS

* NOTICES *

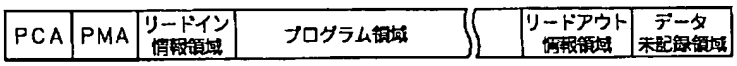
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

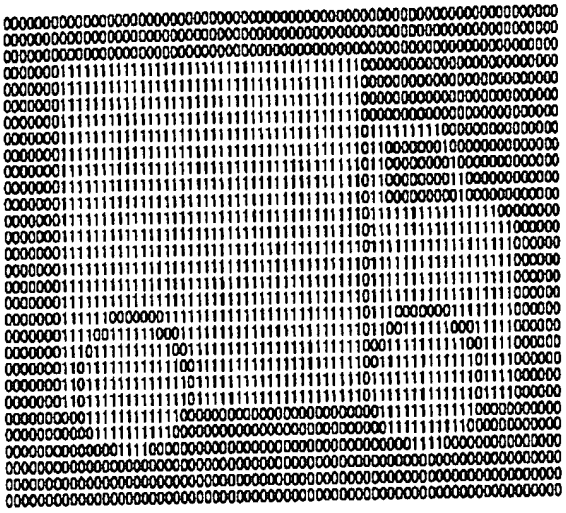
[Drawing 1]



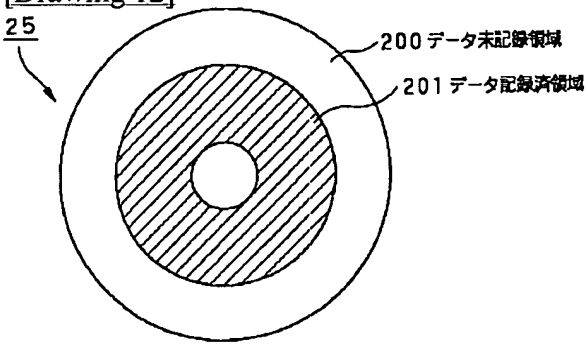
[Drawing 2]



[Drawing 4]



[Drawing 12]



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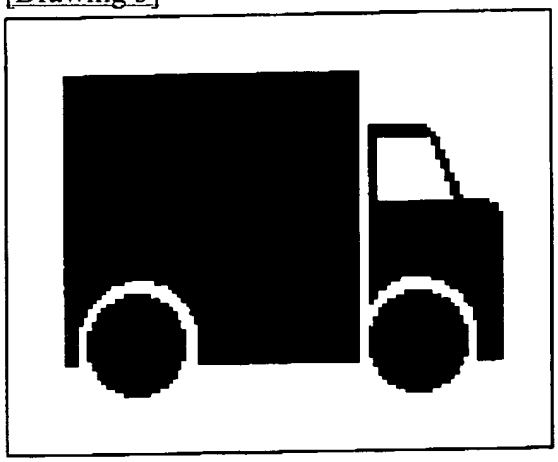
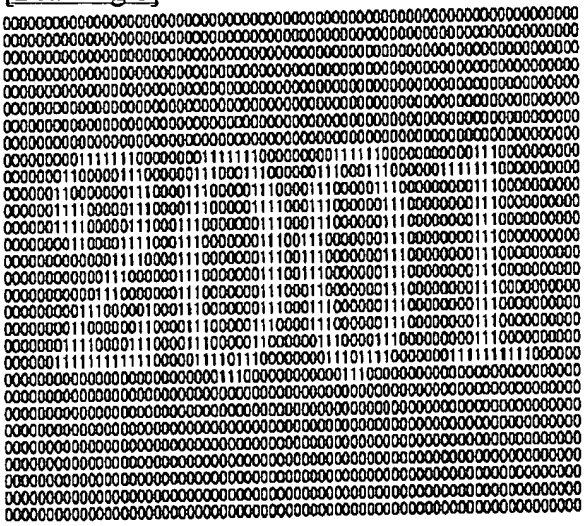
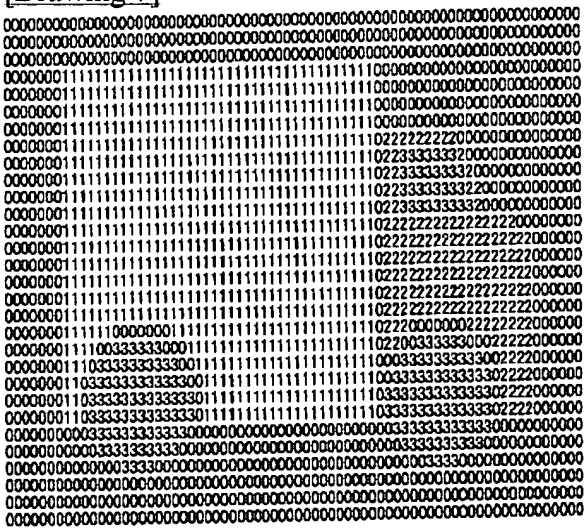


[Drawing 5]

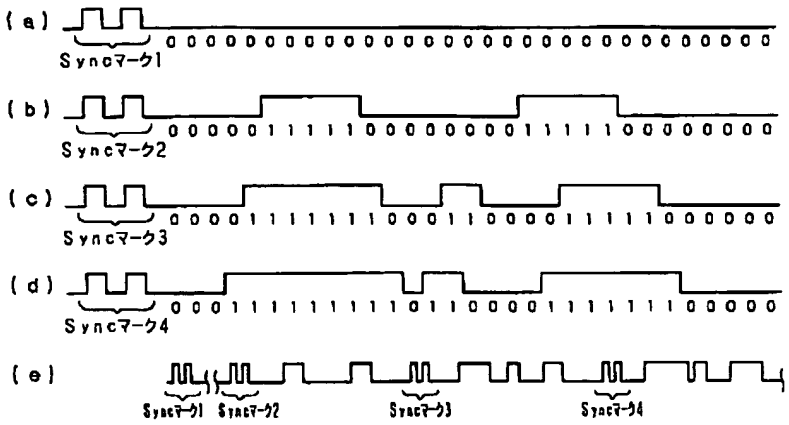
[Drawing 6]



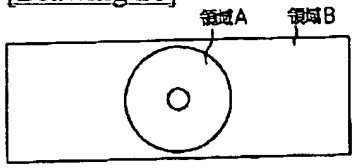
[Drawing 7]



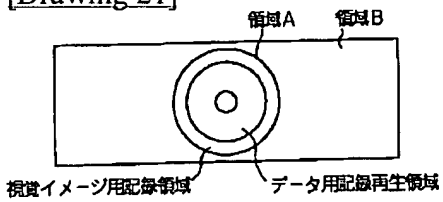
[Drawing 8]



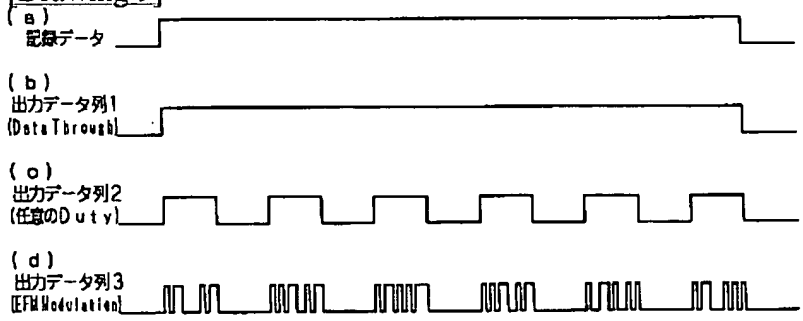
[Drawing 20]



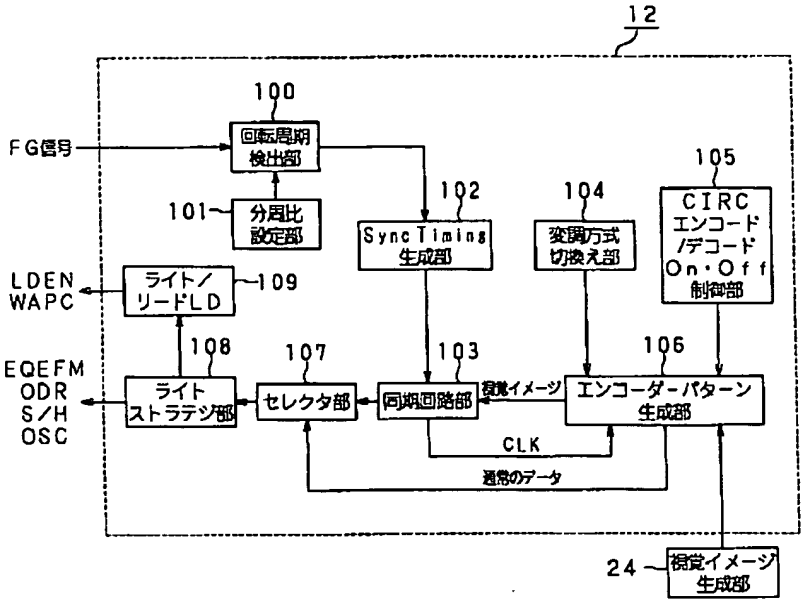
[Drawing 21]



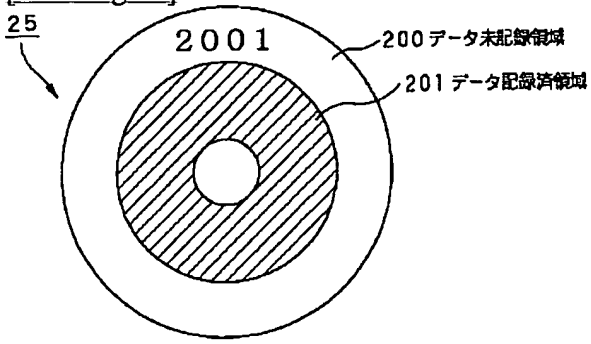
[Drawing 9]



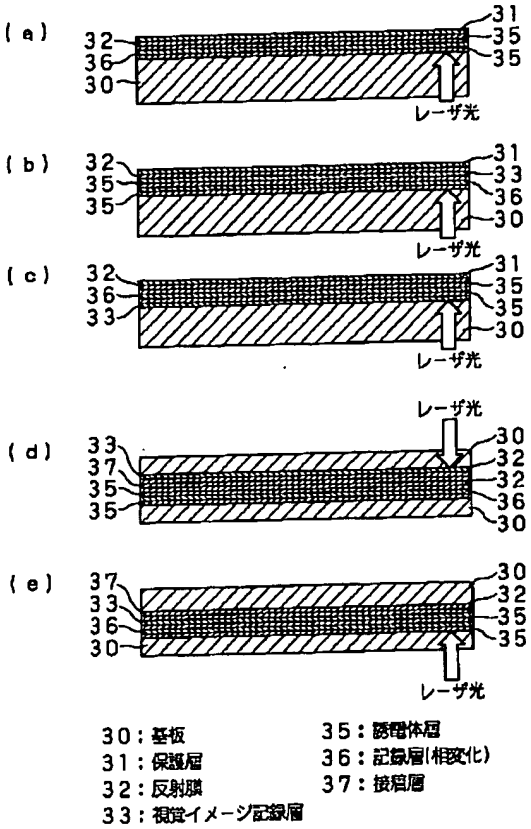
[Drawing 10]



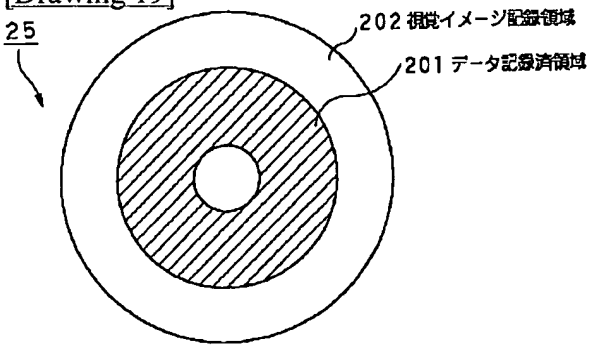
[Drawing 13]



[Drawing 18]



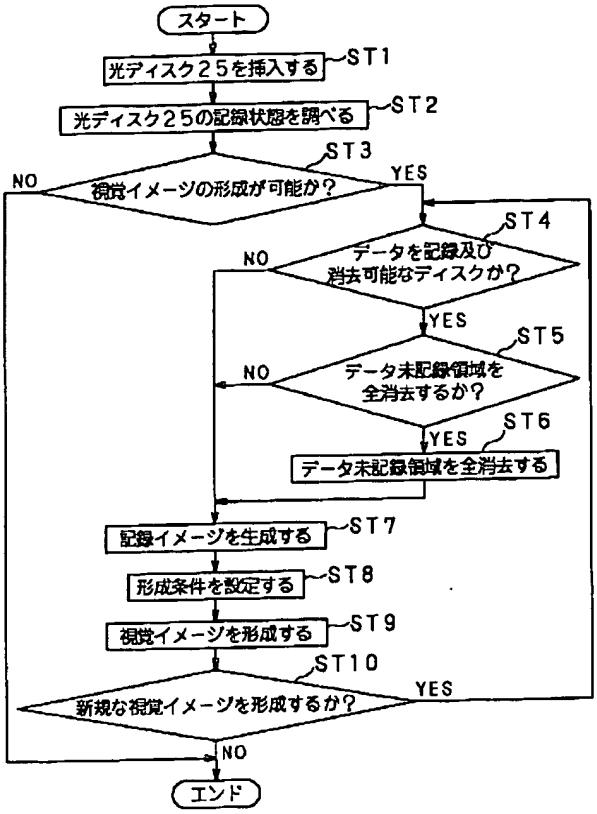
[Drawing 19]



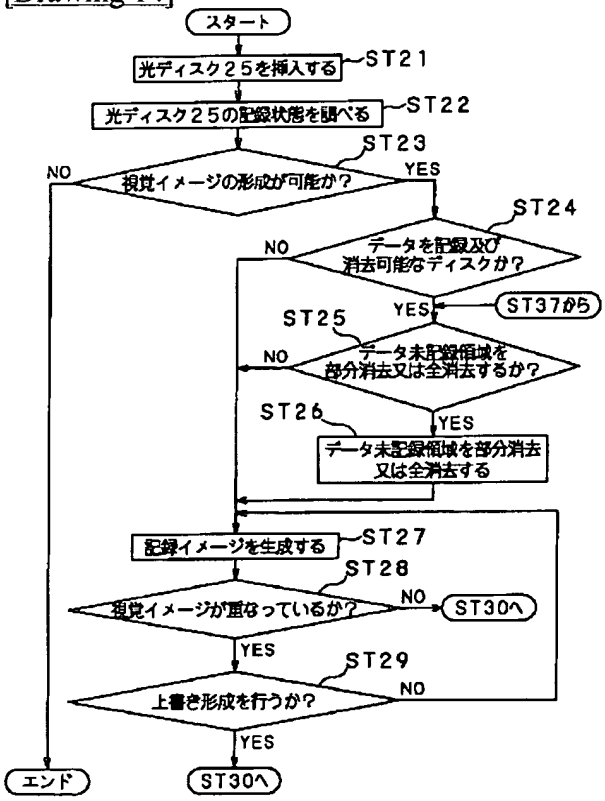
[Drawing 31]

SQ.S1	Control	ADR	TNO	Point	MIN	SEC	FRAME	ZERO	PMIN	PSEC	PFRAME	CRC

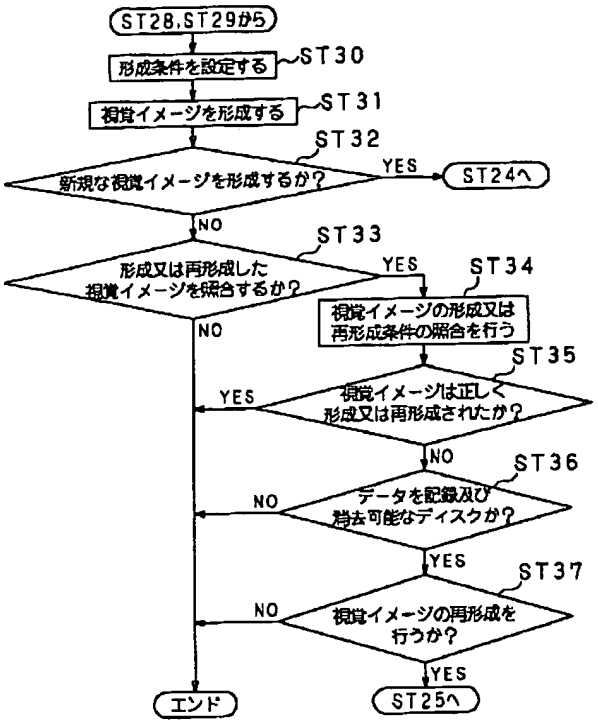
[Drawing 11]



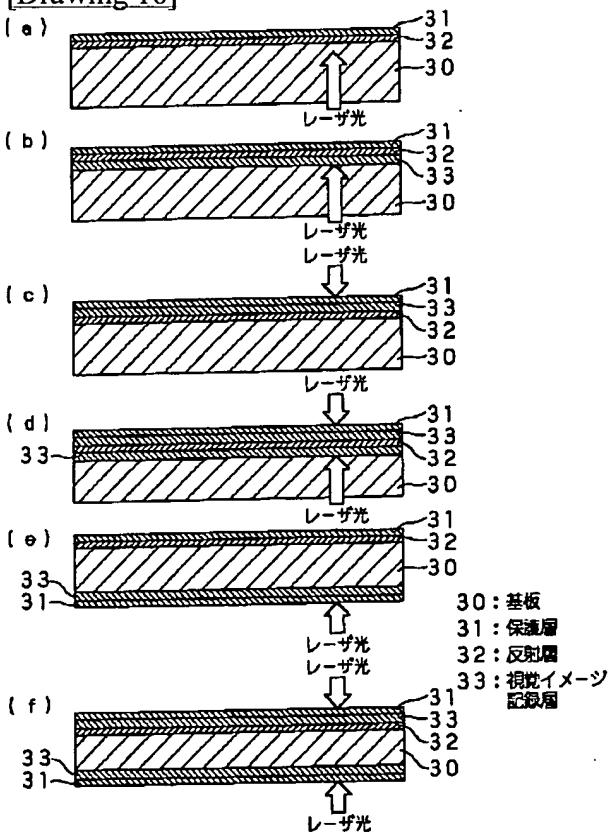
[Drawing 14]



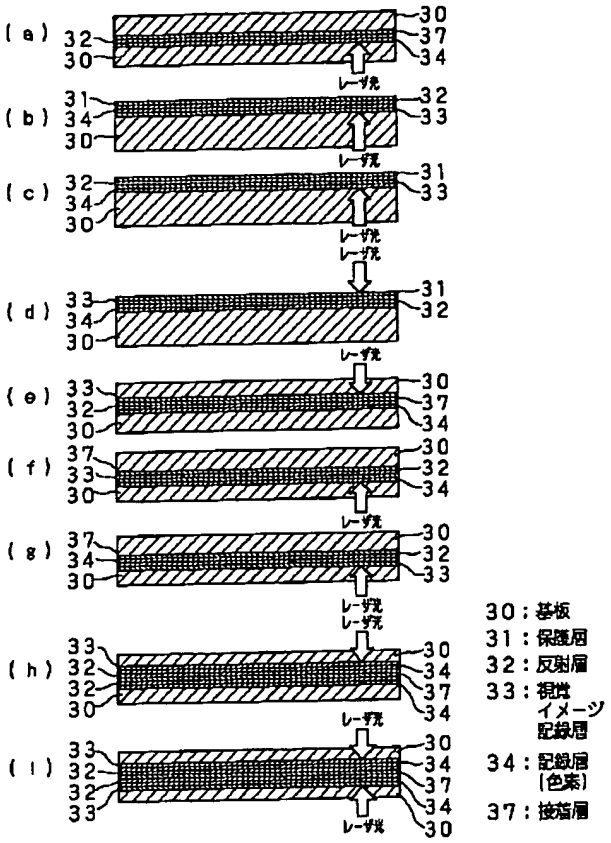
[Drawing 15]



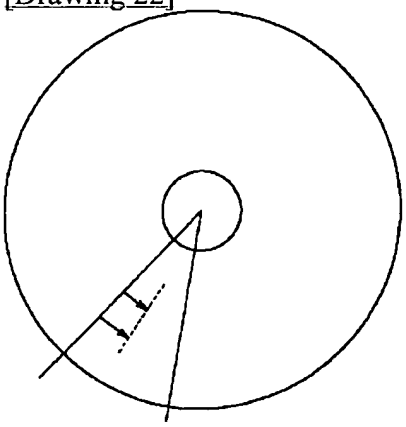
[Drawing 16]



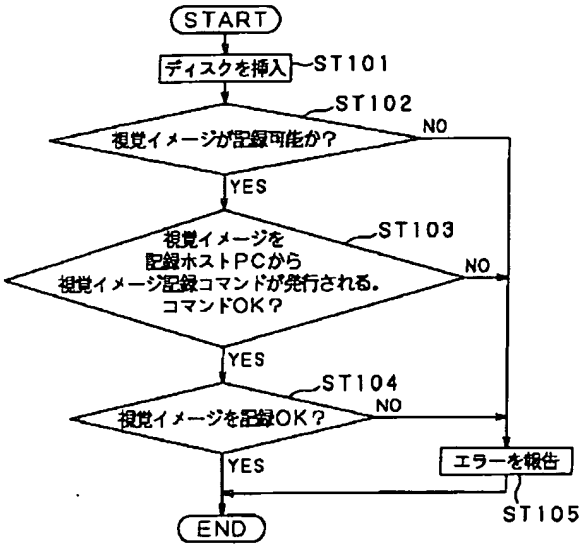
[Drawing 17]



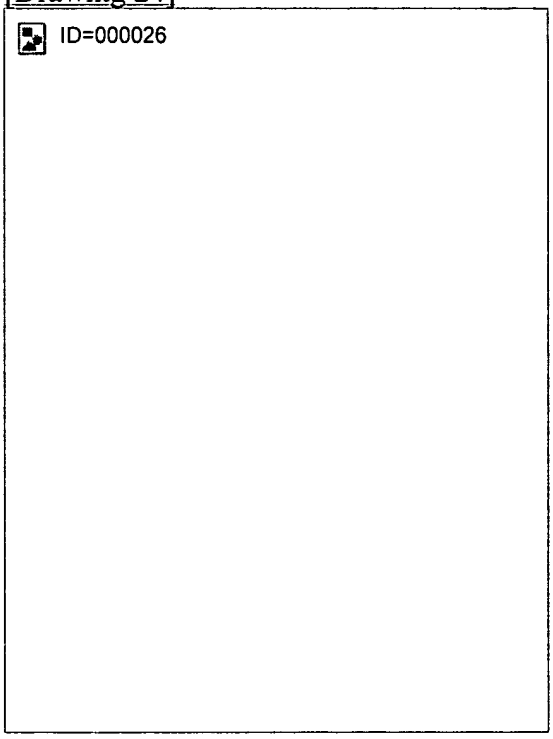
[Drawing 22]



[Drawing 23]



[Drawing 24]



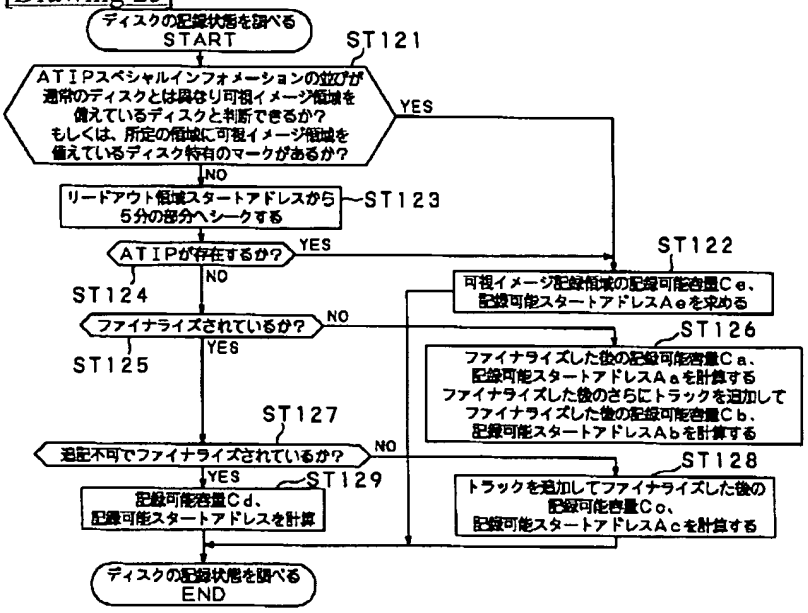
[Drawing 35]

行
1 0 0 0 1 0 0 0
2 0 0 1 0 1 0 0
3 0 1 0 0 0 1 0
4 0 1 1 1 1 1 0
5 0 1 0 0 0 1 0
6 1 0 0 0 0 0 1
7 1 0 0 0 0 0 1
(1 2 3 4 5 6 7列)

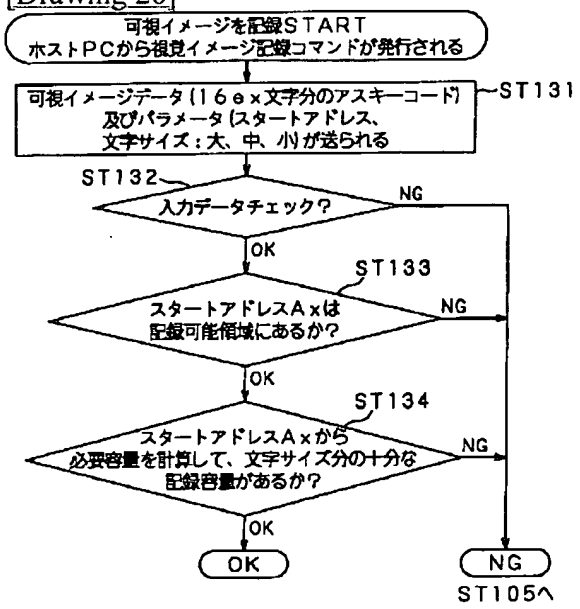
[Drawing 37]

A=
0 0 0 0 0 0 1 0 0 0 0 0 0
0 0 0 0 1 0 1 0 1 0 0 0 0
0 0 0 1 0 0 0 1 0 0 0 0
0 0 1 1 1 1 1 1 0 0
0 0 1 0 0 0 0 1 0 0
1 0 0 0 0 0 1
1 0 0 0 0 0 1

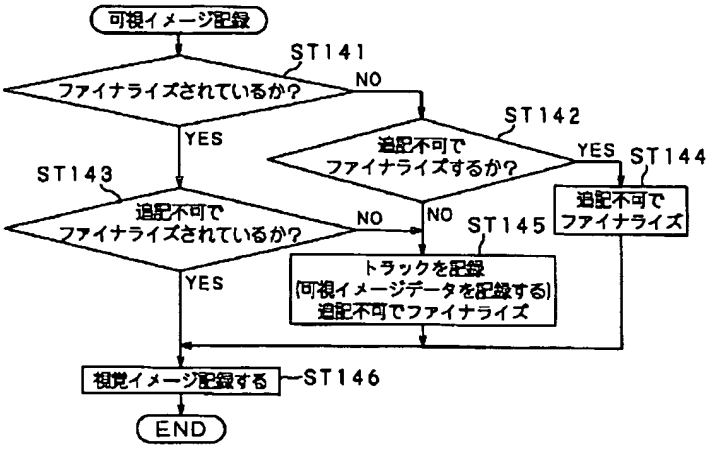
[Drawing 25]



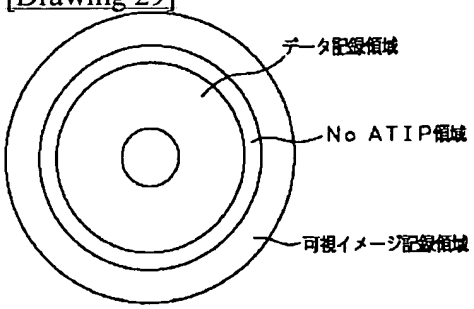
[Drawing 26]



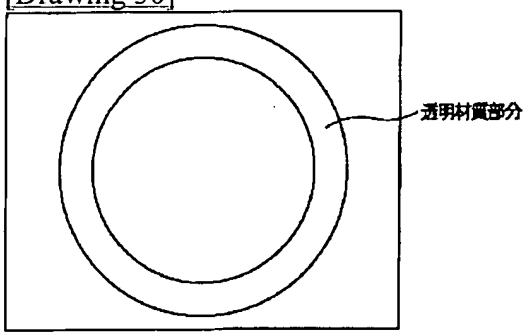
[Drawing 27]



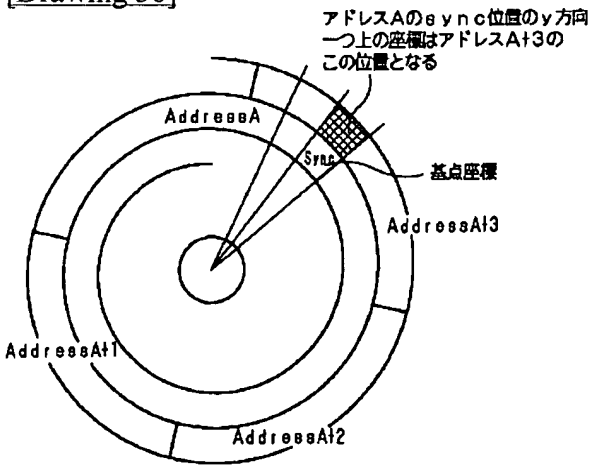
[Drawing 29]



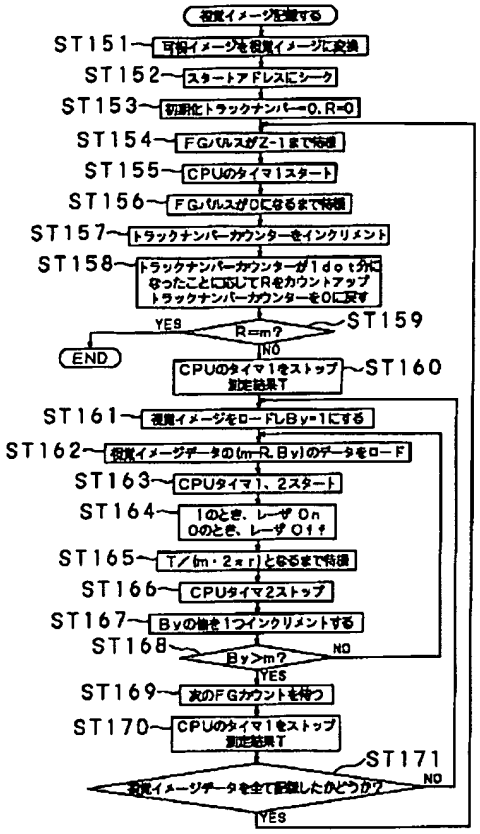
[Drawing 30]



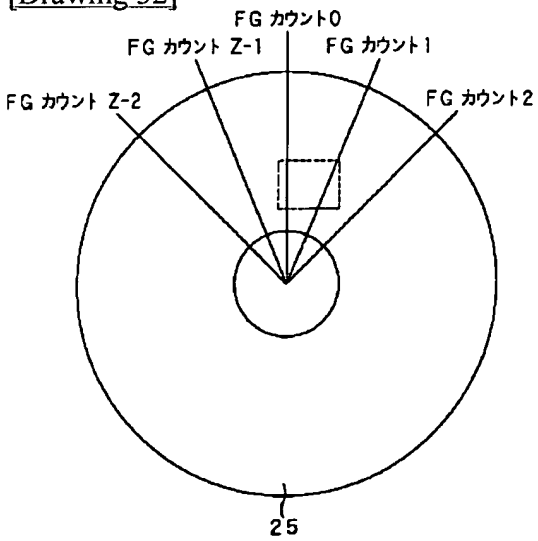
[Drawing 36]



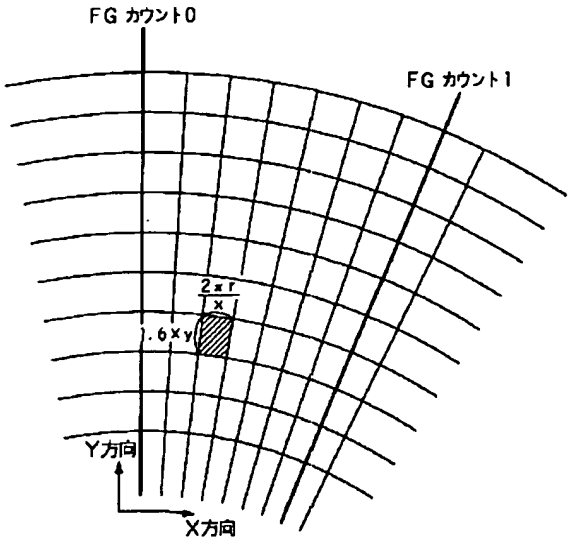
[Drawing 28]



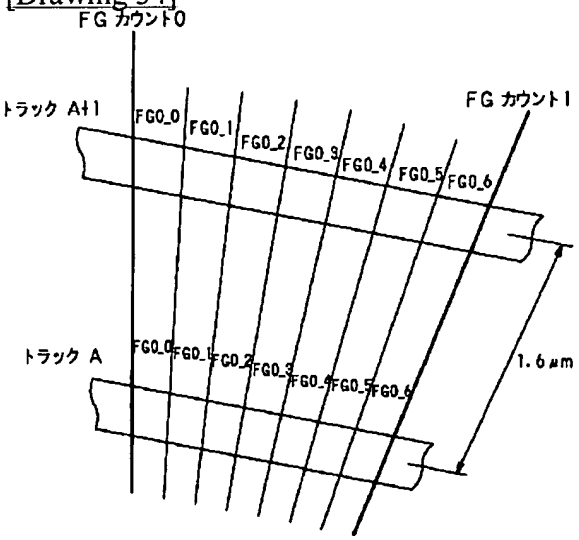
[Drawing 32]



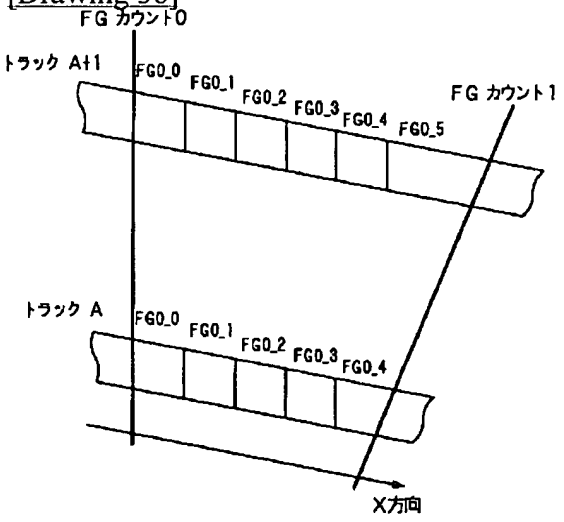
[Drawing 33]



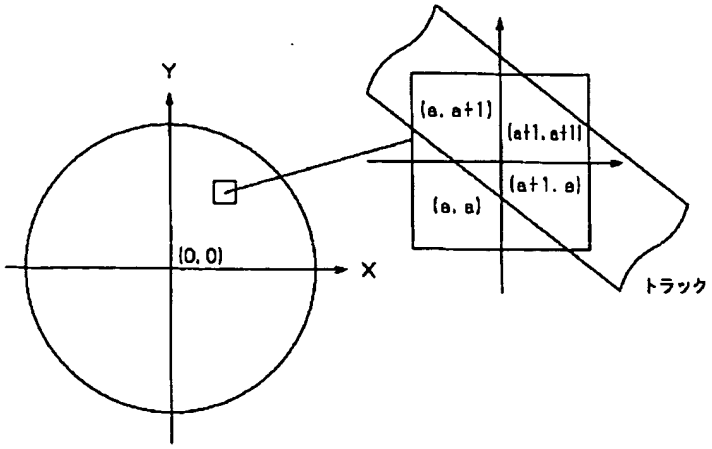
[Drawing 34]



[Drawing 38]



[Drawing 39]



[Translation done.]